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No. 1

REFUSE COLLECTION IN COLUMBUS

Buildings and Equipment—Long and Short Haul Districts for Garbage Collection—Rubbish and Manure Collection—Work Performed and Cost for Each Service—Record Keeping

By E. W. STRIBLING, Superintendent Department of Public Service

The city of Columbus, Ohio, first started to collect garbage as a city proposition about 1907 (it was collected by private firm by contract previous to that year). From then up to July 19, 1910, garbage was collected by hired teams under city supervision and buried in ditches. On July 19, 1910, the municipal reduction plant was placed in operation. About December, 1910, the city commenced to purchase teams and by February, 1911, all teams employed were city teams.

Prior to May 1, 1911, the only refuse collected was garbage. Since that date the department has undertaken to remove all refuse from private dwellings, and garbage from hotels, restaurants and other semi-public places, and in addition all manure and dead animals in the city limits.

The buildings used in connection with the collection of garbage and refuse are a loading station and a stable. The garbage loading station consists of a two-story brick building with railway tracks extending through the building. The building houses two cars at a time. The wagons are driven up an incline driveway on to the second floor, which is about 15 feet above the railway track, and dumped into the cars by means of a power hoist which raises the front end of the body, the rear end of which is hinged to the rear axle.

The stable consists of a two-story brick building, with mule shed attached, having a capacity of 120 horses. The second floor is used for storage of feed, except a portion which is partitioned off for the office, and a locker and bath room for men.

The equipment consists of 4 garbage cars, 34 garbage wagons, 2 dead-horse wagons, 2 small-animal wagons, 24 rubbish dump wagons, 5 wagons with coal beds (for hauling tin cans and old paper), 1 tree wagon, 2 St. Louis

buggies, 115 head of horses and harness and stable supplies. For cost of equipment see exhibit A.

GARBAGE

From January 1 to July 1 garbage is collected once a week; from July 1 to October 1, twice each week; and from October 1 to December 31, once a week.

The average number of teams employed each week from January to July is 17; from July 1 to October 1, 22; from October 1 to December 31, 17.

The city is laid out in 31 districts, which are, as far as possible, so grouped as to give each team an equal number of miles per day. This is accomplished by adopting the "long and short haul" method. By this method no team travels more than 16 miles per day, while the average daily saving in travel per team is about 1½ miles per day. Each team collects two loads daily, except that those collecting from hotels collect three. The loads must average 1½ tons. By this method and the discontinuance of helpers we reduced the cost in 1911 by 43 cents per ton over that in 1910, and expect to show an 8 per cent. reduction in 1912. A detailed statement of the work done during 1911 and the first five months of 1912, and the cost, are given in Exhibit B.

Rubbish

The collection of rubbish was commenced May 1, 1911. The city is divided into 8 districts, each being in charge of a foreman who has control over about 4 teams, 4 drivers, one helper. There are about 32 teams employed regularly, but to collect once in two weeks would require about 40 teams the year around. The cost of the year 1912 will show a great falling off compared with 1911 because of the discontinuance of helpers on wagons.

District foremen are required to see that householders



COLUMBUS PUBLIC SERVICE BUILDINGS. A "CIVIC CENTER."

At the right is the stable. The wagon shed has since been built to the right of this and the mule shed to the left. At the left of this is the garbage loading station, with its inclined driveway. The small building at the left of this is the night-soil station, and the dog pound is the building at the extreme left. In front are grouped the wagons and carts used for refuse collection and street cleaning and sprinkling.

O STATE UNIVERSITY the tot

GARBAGE DISTRICTS OF A PART OF COLUMBUS.

are promptly notified as to the rules and regulations of the department, so that they can aid in improving the

It is the purpose of the department to give each man an individual route, following the same plan as that adopted for the garbage collection, as soon as we get additional equipment, to abolish the district foremen and see to it that the public know the exact day to expect the collector. The plan of individual routes, that is, one route for each team, seems to be the only ideal and economical way of collection.

The number of rubbish collections required of a team varies according to the length of haul, but each must make at least three loads a day.

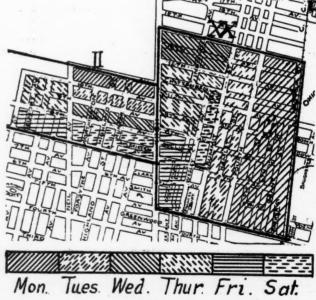
When the city began rubbish collection there was a general clean-up, some of the material having been accumulating for years. At this time 5,366 loads of rubbish were collected.

MANURE

The city collects the manure of all persons who take out a permit to have same hauled. The cost of a permit is \$3 a year for one horse, \$5 for two horses, and \$1 per horse for all over two. The public is not compelled to take out a permit, but can remove there own manure if they desire to do so. They are compelled to remove it once in every ten days, and if they fail the city removes same at a cost of \$2 per load to the owner of the horse

The receipts from the sale of manure on cars and by wagon loads, together with the receipts from the permits, are expected to make this branch of collection self sus-

We have six wagons employed hauling manure, each man having an individual list of barns to collect from.



METHOD OF KEEPING DAILY RECORD OF COLLECTIONS.

EXPLANATION OF DIAGRAMS.

EXPLANATION OF DIAGRAMS.

The larger of the two diagrams on this page shows the method of districting the garbage collection. The loading station is two-thirds down the left edge of the cut. The heavy lines outline the districts; the dotted lines, the daily areas. The small letters indicate the half-day, a being Monday morning, b Monday afternoon, etc.; I being Saturday afternoon. Thus, the driver on route XIV collects every morning near the upper right-hand corner and every afternoon just below the loading station; route XX has a little shorter haul in the morning, a little longer in the afternoon. Routes IV, XXIII and five others have only one area to cover. Each day there is recorded on a map in the office the area covered by each team on the previous day. This is done by coloring the areas covered with crayon, a different color being used for each day of the week. Prints of the city map are used for this purpose, a new one being used each week. The cut above shows a weekly record for Districts II and XX. A part of Saturday's area in XX was not covered.

The amount and cost of this work during 8 months of 1911 are given in Exhibit C.

STABLE

We are feeding and caring for 115 head of horses. There are 14 barn men employed and a night watchman. The feed given daily is as follows:

| 11/4 tons hay | | .\$28.75 |
|--------------------|------|----------|
| % tons straw | | . 5,20 |
| 11½ bushel corn | | . 8.82 |
| 14 bushel oats | | 7.84 |
| 1/20 ton oat equal | | 1.75 |
| Feed | | .\$52.36 |
| Labor | 1 | |
| Cost to feed per | head | \$82.36 |

OFFICE

The office force consists of a bookkeeper, time and record keeper, telephone clerk and inspector.

The cost of each division of operation is placed on a general ledger, subdivided under the different heads, and at any time by referring to the ledger we can immediately get the cost of operation of the different branches of our department.

All our bookkeeping is kept in two books-a general ledger and a requisition book.

In order that we may keep a record of horses, we have each horse branded on the hoof and keep his record on a page of a loose leaf ledger. Such a page is shown in Exhibit D.

The general rules for refuse collection are as follows:

CITY OF COLUMBUS—RULES FOR FREE REFUSE COLLECTIONS.

GARBAGE.

The owner, tenant or occupant of buildings must provide a suitable watertight metal can with cover, and place or cause to be placed therein the garbage accumulating on premises. No paper, ashes, floor sweepings, corn husks or cobs, water,

tin cans, crockery, glass or bottles are to be put in the can with

garbage.

2. Whenever the yards abut upon alleys, the garbage or refuse receptacle must be placed at a convenient point in the yard next to the rear alley so that it may be easily reached by the collector. Where there are no alleys, the can is to be put in the yard not more than twenty-five (25) feet distant from the rear of the house.

All cans or receptacles shall be of a suitable size, and not larger than can be conveniently handled by one man.

REFUSE. Ashes, must be kept in covered cans, tubs or barrels. Such

rubbish as tin cans, bottles, crockery, corn husks and cobs, waste paper and rags, must be kept separate from ashes and in cans, light boxes or barrels.

MANURE. 1. Manure must be kept in boxes or pits with tight covers so as to prevent the ingress and eagress of flies, and next to street or alley, so that it can be conveniently loaded.

Garbage will be collected twice each week from May 1, to November 1, once each week from November 1, to May 1. Manure once in ten (10) days, and other refuse once in two

weeks. Collectors are not permitted to enter houses for the removal of refuse, nor are they to accept any remuneration for their service.

Persons violating the above rules are subject to a fine for each offense of not less than five (\$5.00) dollars or more than fifty (\$50.) dollars.

Householders are requested to report to the department any inattention on the part of the employes. Telephones: Citizens, No. 2760; Bell, Main 2202.

When it can be done, householders are requested to construct

a box according to cut on last page, in which to place the garbage.

We ask your hearty co-operation, in order, that the work may be done without unnecessary expense and at the same time in a thorough and sanitary manner.

H. S. HOLTON Director of Public Service.

Worthington Kautzman, Telephones: Bell, Main 2202. Citizens, No. 2760.

EXHIBIT A.

| GARBAGE COLLECTION DEPARTMENT EQUIPM | ENT. |
|--------------------------------------|-------------|
| Loading station site | \$10,136,40 |
| Loading station | 14,101.64 |
| Collection stables | 42,260.81 |
| Trestle and driveway | 2,153,10 |
| Grading, fill, electric wiring | 2,379.54 |
| Railway siding | 3,161.60 |
| Garbage cars | 7,564:00 |
| Garbage wagons | 7.151.10 |
| Manure wagons | 1.238.93 |
| Dump wagons | 3,466.50 |
| Dead horse wagons | 300.00 |
| Small animal wagons | 185.00 |
| Coal wagons | 625.00 |
| Tree wagons | 90.00 |
| St. Louis buggies | 305.00 |
| Horses | |
| Harness and stable supplies | 5.484.31 |
| Office equipment | 522.51 |
| Steel lockers | 310.00 |
| | |

.....\$125,435.44 EXHIBIT B.

GARBAGE COLLECTED DURING THE YEAR 1911.

| | Tons | An | imals | colle | cted | | Labor | Other | |
|---------------|----------|-----|---------|-------|------|-----|----------|---------|---------|
| | of | _ | -(see 1 | |) | - | and | labors, | |
| Month. Loads. | garbage. | A. | В. | C. | D, | E, | teams. | etc. | Freight |
| Jan 847 | 1,062,68 | 391 | 44 | | 1 | 26 | 2,088.50 | 341.50 | 390.00 |
| Feb 817 | 979.44 | 429 | 70 | 3 | 7 | 7 | 1,452,00 | 392.00 | 360.00 |
| Mar 900 | 1,115.67 | 439 | 72 | 4 | 19 | 26 | 1,491.50 | 407.00 | 405.00 |
| Apr 821 | 1,169.65 | 369 | 108 | 3 | . 32 | 30 | 1,553,25 | 397:50 | 375.00 |
| May 955 | 1,362.65 | 573 | 183 | 4 | 17 | 6 | 1,574.50 | 402,00 | 405.00 |
| June 1,283 | 1,851.47 | 476 | 173 | 1 | 17 | 20 | 2,324,25 | 168.00 | 390.00 |
| July 1,349 | 1,608.45 | 459 | 217 | 1 | 26 | 1 | 2,720,25 | 120,00 | 390.00 |
| Aug 1,481 | 2,182.27 | 299 | 139 | 4 | 26 | 4 | 2,774,25 | 156.00 | 415.00 |
| Sept 1,420 | 2,270.17 | 324 | 304 | 4 | 24 | 2 | 2,941.00 | 156.00 | 405.00 |
| Oct 1,152 | 1,723.24 | 244 | 149 | 5 | 29 | | 2,412.75 | 149.00 | 390.00 |
| Nov 917 | 1,356.73 | 254 | 72 | 4 | 43 | 22 | 1,730.75 | 151.00 | 375,00 |
| Dec 901 | 1,361.88 | 257 | 38 | 2 | 17 | 279 | 1,563.00 | 151.00 | 375.00 |
| | | | | | | | | | |

Total. 12,843 17,544,30 4,514 1,569 35 258 423 24,626,00 2,991.00 4,675,00

| Note.—Animals collected: A—Dogs, B—Cats, C—Cows, D—I Miscellaneous. | Horses, E- |
|---|-------------------------------------|
| Cost of teams and labor. Superintendence, inspection, etc. Freight on garbage Repairs and miscellaneous | 2,991.00 |
| Cost of collecting dead horses | \$32,962.00 1,109.00 |
| Total Cost of collection, per ton Cost of collection, per load Average weight per load, tons | \$84,071.00 1.88 2.64 1.40 |

GARBAGE COLLECTED DURING THE YEAR 1912.

| | | Tons | | imals | | | | Labor | Other | |
|--------|--------|----------|-----|-------|-------|-----|-----|----------|---------|---------|
| | _ / _ | of | _ | (see | note) | | | and | labors, | |
| Month. | Loads. | garbage. | A. | В. | C. | D. | E. | teams. | etc. | Freight |
| Jan | 1,043 | 1,224.64 | 317 | 66 | 54 | 3 | 90 | 2,447.75 | 244.88 | 875.00 |
| Feb | 970 | 1,089.02 | 289 | 87 | . 40 | 7 | 24 | 2,125,25 | 241.25 | 800.00 |
| Mar | 895 | 1,172.55 | 295 | 123 | . 25 | 4 | 119 | 1,968.50 | 244.00 | 210.00 |
| Apr | 903 | 1,226.91 | 310 | 107 | 24 | 2 | 55 | 1,955,60 | 244,00 | 210.00 |
| May | 965 | 1,373.64 | 441 | 224 | 18 | - 4 | 61 | 1,986.75 | 244.00 | 255.00 |

Total. 4,776 6,086.76 1,652 607 161 20 849 10,483.85 1,218.13 1,350.00 Note.—Animals collected: A—Dogs, B—Cats, C—Cows, D—Horses, E—

| Miscellaneous. | \$10,483,85 |
|----------------------------------|-------------|
| Cost of teams and labor | |
| Superintendence, inspection, etc | 1,218.13 |
| Freight on garbage | 1,350.00 |
| Repairs and miscellaneous | 337.50 |
| | |
| | |

Cost of collecting dead horses Total
Cost of collection, per ton
Cost of collection, per load
Average weight per load, tons \$13,989.48



RUBBISH AWAITING COLLECTION, RESIDENCE STREET. Large amounts of rubbish were put out by the citizens all over the city during the first clean-up.

\$6,296.23

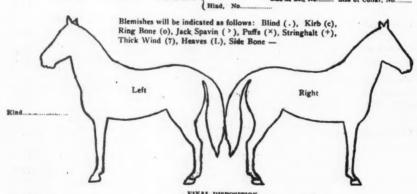
EXHIBIT C.

| DRY RE | FUSE A | ND MANU | RE COLLEC | TED IN | 1911. | |
|---|-----------|-------------|------------|--------|--------|-------------|
| | | ry refuse- | | | -Manu | re |
| , | | Labor and | Other | . ' | | Labor and |
| Month. Loads. | Yards. | teams. | labor, | Loads. | Yards. | |
| May 2,501 | 10,004 | \$5,737.82 | \$268.00 | 791 | 2,373 | \$1,296,23 |
| June 3,525 | 14,100 | 8,225,77 | 239.00 | 486 | 1.458 | 750.00 |
| July 1,528 | 6,112 | 3,991.07 | 311.00 | 687 | 2,061 | 1,125.00 |
| Aug 1,355 | 4,065 | 2,927.75 | 309.00 | 394 | 2,970 | 757.75 |
| Sept 1,200 | 3,600 | 3,023,81 | 304.00 | 615 | 8,075 | 898.75 |
| Oct 1,371 | 4,113 | 2,638.00 | 304.00 | 620 | 8,100 | 985.00 |
| Nov 1,447 | 4,341 | 2,616.50 | 304.00 | 544 | 2,720 | 975.00 |
| Dec 1,786 | 5,358 | 3,246.75 | 304.00 | 430 | 2,150 | 975.00 |
| Total14,713 | 51,693 | \$32,407.47 | \$2,343.00 | 4,567 | 19,907 | \$7,712.73 |
| | | | | -, | , | 4., |
| Cost of teams and | d labor | Dry R | | 7744 | | 600 407 4P |
| | | | | | ***** | \$32,407.47 |
| Superintendence, i Supplies, repairs a | nspection | elleneeus | | | | 2,343.00 |
| ouppnes, repairs a | ind misc | enaneous | | | | 1,521.64 |
| | | | | | | \$36,272.11 |
| Cost of collection | per load | | | | | 2.46 |
| Cost of collection | per var | d | | | | .65 |
| | per jui | Manı | 180 | | | .00 |
| Cost of teams and | labor | | | | | \$7,712.73 |
| Supplies, repairs, | | | | | | 125.00 |
| cappiles, repaire, | | | | | | 120.00 |
| Total cost | | | | | | \$7,837.73 |
| Received from the | | | | | | \$1 541 50 |

| Actual cost | | | | | | | \$6,296.23 |
|---------------------|------------|----------|------------|--------|-------|-------|------------|
| Cost of collection, | | | | | | | 1.72 |
| Cost of collection, | ner load | receints | deducted. | | | | 1.38 |
| Cost of collection, | per vard | receipes | acadetea. | | | | .39 |
| Cost of collection | per yard | rocoint- | deducted | | | | |
| | | | | | | | .32 |
| DRY RI | EFUSE AN | D MAN | URE COLLI | ECTED | IN 19 | 112. | |
| | 75 | | | | | | |
| | | | | | N | | |
| | | bor and | | _ | | | Labor and |
| Month. Loads. | Yards. | teams. | labors. | Loads. | Yards | Tons. | teams. |
| Jan 1,735 | 5,205 | 3,095.00 | \$275.32 | 463 | 2.315 | 926 | \$1,058.00 |
| Feb 2.186 | 6,558 | 3.352.25 | 272.50 | 433 | 2,165 | | 1.061.50 |
| Mar 1,973 | | 3,036,75 | 272.50 | | 1.870 | 748 | 924.35 |
| Apr 3,967 | | 5,482,97 | 272.50 | 192 | 960 | 384 | 360.80 |
| May 2,950 | | 4.292.50 | 272.50 | | 1.170 | 468 | 591.00 |
| | 0,000 | -, | ~.~.00 | 201 | 1,110 | 400 | 001.00 |
| Total12,811 | 38,433 \$1 | 9,259.47 | \$1,365.32 | 1,696 | 8,480 | 3,392 | \$3,990.65 |

Descriptive List and Record of Public Animals, City of Columbus, Ohio. DEPARTMENT OF PUBLIC SERVICE.

SANITARY REFUSE



| | FINAL DISPOSITION. | |
|-----------------------|--------------------|-----------|
| Died.—Cause | When | Where |
| 1. C. and Sold.—Cause | When Where | Price \$ |
| Transferred to When | Where | Authority |
| Date. Lha | arka: | 1 |

Cost Maintenance and Earnings

| 1 | DATE | ITEM | DENT | | | | TE. | ITEM | | CREDIT | | | |
|---|------|------|------|---|---|---|-----|--------|---|--------|---|---|--|
| | | П | T | T | | | | \top | T | T | | | |
| + | | | - | + | - | _ | - | | - | + | + | - | |

FRONT AND BACK OF A PAGE OF LOOSE LEAF LEDGER FOR RECORDING HISTORY OF DEPART-MENT HORSES.

| Cost of teams and labor | 1,365.32 |
|---|----------------------------|
| Cost of collection, per load | \$20,894.79 1.64 -54 |
| Cost of teams and labos | 482.00 |
| Total cost | |
| Actual cost | 2.72 1.41 .55 .28 |
| *Price received, 50 cts. per ton f. o. b. city tracks, or \$1.25 wagon load, depending on length of haul. | to \$1.50 per |

NOTES CONCERNING COLUMBUS REFUSE DIS-POSAL

THE garbage loading station referred to in the above article is located on a considerable piece of property owned by the city, which was originally quite low, but has been graded up several feet. On this property are not only the loading station, but also the stable referred to, a large wagon shed, a dog pound and a night soil station. Here also are located repair shops of the department, consisting of a paint shop, blacksmith and wheelwright shop, etc. The apparatus of the department is kept in order in these shops, the brooms of the street sweepers are refilled, and a few wagons have been built, most of these being the special wagon bodies used

for collecting manure. The wagon shed is a large shed open on one side and end, where are kept the street sweepers, sprinklers and wagons for the various services.

The stable is but a few feet away from the shed. In this are stalls for 106 horses. The entire floor is of concrete scribed off into four-inch squares. In each stall the concrete slopes toward a covered gutter which passes by the ends of all the stalls in one row, and the stall floor is of plank laid with slightly open joints, so that all liquids can flow through to the concrete floor and thence to the gutter. These stalls are cleaned daily. The harness of each horse is hung at the end of his stall, a small harness room being provided at one end of the stable for spare harness. In addition to the horses, 20 mules are used in the garbage collection and are preferred for this service. Owing to the fact that the stalls were all required for the horses, and especially because mules seem to thrive better out of doors, these mules are kept in a pen with open sides which is built adjacent to the stable.

On the second floor of the stable is kept the grain, hay and other stable supplies. The grain is kept in round wooden tanks, as this form is more economical to construct than square ones. Openings in the floor of these tanks permit the grain to be discharged directly to the floor below. On this floor also are lockers for the men employed about the stable, two shower baths for their use, toilets, etc. In one corner of this floor is the office of the collection department, where are kept all the records referred to in the article. The ceiling of the stable, which

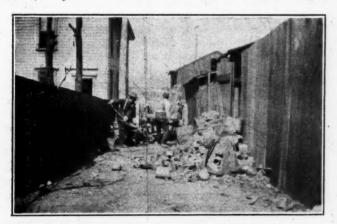
is also the floor of the rooms above, is built of reinforced concrete, beam and slab construction. The walls of the stable are of brick.



RUBBISH WAGONS, JUNE, 1912.

The garbage wagons used by the department were especially built according to the city's specifications. They consist of a rectangular steel body mounted on heavy running gears and provided with a spring seat. The cover used is one of canvas put on in sections, which makes it necessary to uncover only a part of the wagon at a time and at the same time does away with the noise which is found to be so objectionable when metal covers are used. These wagons have a capacity of $2\frac{1}{2}$ cubic yards, and the net weight of the loads actually collected varies from $1\frac{1}{2}$ to 2 tons.

The garbage cars were specially made, having a steel semicircular body set on trunnions so that they can be turned to discharge the load. The cars have a capacity of 80,000 pounds and hold about 1,400 cubic feet of gar-



COLLECTING RUBBISH IN ALLEY DURING GENERAL CLEAN-UP.

bage. By means of a siding at the loading station and another at the reduction plant, the cars are hauled directly from one to the other, a distance of about two miles.

The dog pound is a comparatively small one-story frame building in which are about one dozen pens for confining the dogs. They are not killed by the use of gas, but are shot and their bodies sent to the garbage reduction plant.

The night soil station is in a brick building by itself, which contains a concrete-lined pit below the floor level about 5 feet wide and deep and 20 feet long, into which pit the night soil is dumped directly from the collecting wagons. At one end this pit is connected with the sewer, just above the outlet being an iron grating to prevent cans and other large articles from entering the sewer. At the opposite end is a pipe from the water main by which a large volume of water can be flushed through this pit, thus diluting the night soil and washing it into the sewer. This plan is not considered perfectly satisfactory and it is hoped that a better one will be worked out before long.

STANDARD HOSE COUPLINGS

History of Attempts at Securing Adoption of Them—Cost
of Changing to Standard—Cities Which
Have Changed or Adapted

At the convention of the American Water Works Association F. M. Griswold read a paper reviewing the history of attempts at standardizing hose couplings and hydrant fittings, and the progress which has been made to date in securing the general adoption of the standard now recommended by a number of national organizations. It seemed to him that, in this age when all engaged in the mechanical arts are endeavoring to secure uniformity in practice, especially in the design and proportions of appliances in general use, it is remarkable that the threads of fire hose and hydrant fittings should have remained for so many years subject to the caprice or ignorance of various manufacturers and especially of municipal officials who were called upon to design and purchase them.

Apparently the first move towards devising a national standard was in 1873, when the convention of fire engineers, urged by the illustration offered by the great Chicago fire of 1871 and the Boston fire of 1872, adopted a resolution affirming the desirability of a standard and appointed a committee to report a standard coupling. A standard was recommended and was adopted by the chiefs of a number of cities; but nothing further came of it. In 1875 the same organization adopted another standard, and reaffirmed it in the 1876 convention, but nothing apparently came of this further than printing it in the proceedings of the society. In 1878 a special committee reported that the 1875 specifications were impracticable, but presented no new ones. In 1879 another standard was adopted by the same society, but never put into use. In 1883 the firemen endorsed the 1879 specifications, and some sporadic effort seems to have been made towards securing State legislation, but with no definite results.

In 1890 the firemen again appointed a committee to consider this matter, and in 1891 C. A. Landy "presented a very complete and comprehensive report, covering the details of coupling dimensions in use in some 1,339 towns and cities of the country where 2½-inch fire hose was in service, showing outside dimensions of 3 to 3½ inches, and including 7, 71/2 and 8 threads to the inch; and having demonstrated by the use of a model coupling of 3 1-16-inch outside diameter, with 71/2 threads to the inch, that about 70 per cent. of the couplings listed in his report might serviceably be converted to use with a coupling of these dimensions, through the simple process of decreasing the diameter of the male thread, or of increasing that of the female swivel, urged the adoption of a standard conforming to these dimensions as an intermediary which would permit standardization at the least expense of time or money." It is practically this standard which is now being urged for general adoption and which has been endorsed by a number of national organizations. Nothing came of Mr. Landy's report at the time, but in 1904 the National Fire Protection Association sent Mr. Griswold as a delegate to the convention of the International Association of Fire Engineers to urge joint action of these two organizations in an effort to secure the general adoption of a national standard hose coupling. The latter organization appointed a committee to act with one from the former organization which, using the Landy report as a basis. recommended the present standard.

In May, 1905, the desirability of adopting this was presented to the American Water Works Association, which voted in favor of it; and in August of the same year it was adopted by the International Association of Fire Engineers. In the same or following years this standard has

also been endorsed by the following organizations: National Board of Fire Underwriters, New England Water Works Association, Pennsylvania Water Works Association, National Firemen's Association, North Carolina State Firemen's Association, Virginia State Firemen's Association, Minnesota State Firemen's Association, American Public Works Association, League of American Municipalities, National Fire Protection Association, American So-

ciety of Municipal Improvements.

Data have recently been collected from over 3,000 cities, and an analysis of these has demonstrated that approximately 80 per cent. of the couplings listed are either of standard dimensions or may readily be so modified as to conform to them without the necessity of replacement; while the cost of conversion or replacement has been demonstrated to be so small as to be almost negligible in comparison with the advantages obtained. This record shows 73 cities or towns in which this standard has been put into service as a result of the recent campaign, seven of these including the complete substitution of this standard for previously used non-standard hose couplings and hydrant

Notable among the latter was the city of St. Louis, Mo. Here over 1,000 hydrant outlets and the couplings of many thousands of feet of fire hose were changed from a socalled bastard six-thread to the standard, all of the work being done by city employes at an average net cost of \$1 per hose coupling and of \$2.82 per hydrant outlet, the latter being principally of 41/2-inch steamer suction type, each of which was laboriously chipped out by use of a cold chisel. This action of St. Louis was shortly followed by a similar change by East St. Louis. During the winter of 1910 Springfield, Mass., substituted the standard for the previously used "universal clutch," changing over 1,350 hydrants, some of which had four outlets, at the rate of 50 to 100 outlet replacements per day. The average net cost of this was \$1 per outlet, giving credit for the old metal, which was sold at 91/2 cents per pound, and excluding the cost of labor performed by the regular force of water works employes. Couplings of 22,000 feet of hose were changed by the department employes at a like net cost of \$1 each.

It is interesting to note that this work at Springfield was carried out in the winter season, and that it was accomplished without accident by the use of surprisingly simple and expeditious methods, in that where hydrant nipples were leaded in the use of a six-pound sledge proved an efficient means for their removal, while in the case of screwed-in nipples an expanding wrench, entered from the outboard end of the nipples, engaged the operating lugs and permitted the easy removal of the device, while the 4½-inch leaded-in suction nipples were melted out by the use of a plumber's gasolene blow-torch at the rate of five minutes per operation. This practical and unique demonstration of "how to do it" is commended to your serious consideration.

Following this action at Springfield the contiguous cities of Chicopee, Holyoke and West Springfield each brought their equipment into conformity with the standard at an expense probably no greater than was that of the change in Springfield. Shreveport, La., replaced the old-time "Feyh" coupling by installing the standard, but we have no data as to method of procedure, nor as to the cost of the operation.

In the cases of the 66 towns and cities which are known to

In the cases of the 66 towns and cities which are known to have adapted non-standard couplings to interchange with the standard, the work has been accomplished entirely by the regular force of public employes, and outside of the time used the expense has been nominal, at most involving the cost of an adjustable tap and die, conforming to the pitch of the non-standard thread, by the use of which these couplings were so

standard thread, by the use of which these couplings were so modified as to become readily interchangeable with the standard. It will perhaps prove of interest to you to have cited some of the prominent cities and towns which have thus brought their equipment into harmony with the National standard. Atlanta, Ga., used both 7 and 7½ thread couplings for years without serious trouble from these differences, but now uses the standard only. Watertown, N. Y., in making the change to standard discovered that they had three different kinds of hydrant outlets, varying both in number of threads and in their autside dimensions all of which have been made to contheir outside dimensions, all of which have been made to conform to the standard without other cost "than the casting of a

form to the standard without other cost "than the casting of a die," as stated by the chief of the fire department.

In addition to the above, the change to standard by modification of couplings in the following cities has been accomplished at so low a cost and with so little trouble that those responsible for this evidence of progressive action have not considered it necessary to prominently exploit their good work.

Eufaula and Huntsville, Ala.; Enfield, New Britain and Norwich, Conn.; Moline, East Moline and Rock Island, Ill.; Elkhart and Hammond, Ind.; Davenport, Ia.; Brockton and Newburyport, Mass.; Battle Creek, Grand Rapids, Jackson, Lansing, and Monroe, Mich.; Greenville and Jackson, Miss.; Carthage and Neosha, Mo.; New Brunswick and Trenton, N. J.; Binghamton, N. Y.; Columbus, Mansfield and Wilmington, O.; Columbia, S. C.; Jackson and Nashville, Tenn.; Brownsville, Port Arthur and Tyler, Tex.; Bellows Falls, Vt.; Everett, Port Townsend, Seattle and Tacoma, Wash.; Cudahy, Manitowoc and Milwaukee, Wis.

This list could be materially enlarged by naming some thirty

This list could be materially enlarged by naming some thirty other towns of less prominence which are known to have brought their equipment into conformity with the standard, while from information not yet verified it is beleved that a number of other localties have taken like action. In addition to the above noted instances of adaptation, the record shows the installation of the standard in 122 localities not so listed at the date of the last issue of the Record in 1911; and in eviat the date of the last issue of the Record in 1911; and in evidence of the widespread interest aroused in this important matter of standardization, it may be stated that one prominent concern, manufacturing fire hydrants, reports having filled orders for hydrants under "National standard" specifications for some forty-six separate towns and cities, included in which number may be named Montreal, Port Hope, St. Anne and St. Joseph in the Dominion of Canada, and the town of Abonito in Porto Rico.

CONCRETE WORK IN PITTSBURGH

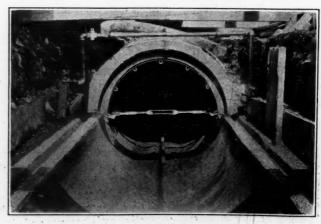
ENORMOUS quantities of concrete are being used in the great scheme of improvements which is being carried forward by the city of Pittsburgh in the matter of flood prevention. In this connection the city has made extensive improvements in street-raising along the Allegheny, Monongahela and Ohio rivers. Streets in the lower-section of the former city of Allegheny have been raised by fills that in some instances attain a height of 11 feet.

Municipal work is now under way in the West End district of the city, where the streets along the Monongahela and Ohio rivers are being raised from one to fifteen feet. All the walls are of concrete. All important sewers, heretofore constructed of brick, are being reconstructed of concrete, and over one stretch of ground a concrete wall

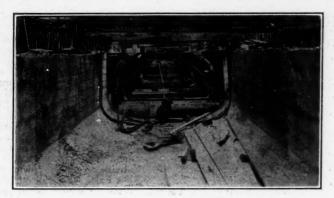
is being built one and one-half miles long.

Concrete is being used in other extensive municipal improvements also. Among these is the work in the elimination of the Try street grade crossing over the Pittsburgh, Cincinnati, Chicago & St. Louis Railroad. This undertaking involves the expenditure of \$600,000. Practically all' the material used is concrete, including the erection of retaining walls and the laying of sewer mains.

A new concrete bridge with a concrete approach is now under construction at Murray avenue and William Pitt



EXPANSION JOINT OF 52-INCH SEWER, FLOOD DISTRICT.



INVERT OF TRY WAY SEWER, SHOWING FORMS.

boulevard. At this point an old frame bridge crosses the boulevard 600 feet above the latter thoroughfare. This is being supplemented by a concrete arch. The Atherton avenue bridge is another important piece of concrete work. In the rehabilitation of the Point bridge spanning the Monongahela immense quantities of concrete are called for. The old bridge is being razed and many of the old piers are being supplemented by new, owing to cracks in the old pier structure.

MUNICIPAL FINANCIAL METHODS

Municipal Accounts of Lowell, Mass.—Making and Recording Payments—Assessing and Collecting
Taxes—Bonds and Notes

The Commission Government of the city of Lowell is in charge of five commissioners, four known as aldermen and one as mayor. One of the aldermen is known as the Commissioner of Finance, and according to the act of 1911 he is required on March 31st of each year (the end of the municipal year) to cause a complete examination of all the books and accounts of the city to be made by competent accountants, and to publish the same. The examination for the first year has been completed by Geo. M. Rex, certified public accountant, and his report has been published by James E. Donnelly, the Commissioner of Finance.

As this was the first occasion of such examination, it required a more or less extended search into the past records of the city's finances. This examination by an expert led to his making a number of recommendations of changes in methods, as would probably be the case in a considerable percentage of the cities of the country whose financial methods have not been placed upon a business basis by expert accountants. In general, his criticisms are covered by the following statement:

In the examination of the different departments it was plainly evident that there was a lack of system by which departments having relations with each other could be properly checked. Department bills for labor, material or supplies, or all, have been made out, given to the treasurer to collect, and then apparently forgotten by the department making them out. In some cases, departments have stated that when this was done their part of the transaction ceased. And beyond the entering of the bill in the card account of the treasury department and the sending out of the bill, there has apparently not been the personal interest displayed to collect the bill that there should be by one who is interested in the success of the business of his employer. I have been informed that there is an ordinance in force which requires a record being furnished the auditor of all bills placed by the department in the treasurer's office to collect before placing them there, but the auditor states that this ordinance had been practically a nullity during the year. The reason for such an ordinance is perfectly plain. The auditor is supposed to be the accountant, and should know what the treasurer is to receive his cash from; the treasurer is the cashier, and is supposed to account for what money he receives. How is the auditor to have positive knowledge that the treasurer accounts for all the receipts, unless he has an account of what he is to receive the income from? In connection with this, I desire to state that the con-

dition I found in the treasurer's department in relation to receivables was surprising. There were no original data of bills placed to collect, and even the tax bills which had been made out had been sent to the many taxpayers. This condition brought the matter of auditing these accounts down to the point of proving clerical accuracy and honesty. The clerical work, so far as receipts were concerned, could be proven. The clerical honesty could only be proven by a demand being made upon each taxpayer whose tax appeared on the roll as being unpaid, and a demand being made upon each person whose account remained open on the card record.

Concerning the matter of assessing and collecting taxes, Mr. Rex stated that "while the assessing is looked upon in general terms as being all important, there is not the care taken in seeing to it that proper assessments are made, that there should be. This broad statement can be proven in city after city, and while it is generally admitted by those who have studied the subject to be so, and while the authorities in many places have had it called to their attention, still there has not been the earnest, honest effort to correct the evil, if evil it may be called." He recommends that the tax bills be made out by the clerks of the assessing department and that these bills be all numbered, the number to correspond with the assessment number. The bills should be made in triplicate by carbon, all in different colors, one to be sent to the taxpayer and two retained in the treasurer's office. When a tax is paid the two copies in the treasurer's office would be stamped as paid and one given to the taxpayer as a receipt, the other retained. Under this method the tax roll could be proven, while under the method criticized by the accountant there was no method of proving the tax roll except by interviewing each taxpayer whose tax is shown upon the assessment roll as remaining unpaid, and ascertain whether or not it has been paid. Under the old system, as taxes are received they are entered in the tax receipt books; from here the receipts are entered in the main cash book and also are posted on copies of the tax roll. The copying of the figures from one book to another is likely to introduce errors and omissions, and, in fact, a considerable number of such errors were discovered in this case.

Another matter of municipal finance discussed in this report, and one which we have had occasion to refer to several times, is that of the issuing of bonds and notes. "Bond debts or serial note debts should never be issued except for some improvement of a permanent character." Lowell is by no means the only city which has entirely disregarded this principle and has issued bonds and serial notes for the payment of payrolls, repairs and maintenance charges, all of which should clearly be paid from current revenue. Probably in the majority of cities where this policy is pursued it is because of the failure of the various departments to keep their current expenses within the appropriation for the year. In some States it is a criminal offense for any municipal official to permit the current expenses of his department to exceed the appropriation for that year; and that rule should be rigidly adhered to in every city, whether it is required by law or not. This, of course, requires a carefully prepared budget and an appropriation based on a definite plan of what it is proposed to do during the coming year and how much this will cost.

But not only should bonds not be issued for current expenses, but the life of the bonds should be approximately equal to that of the improvement to be purchased by them. Thus sewer bonds could be issued for 50-year periods without criticism, but paving bonds should not be so issued unless divided into two series, the long term series to cover the payment for concrete foundations only. Commissioner Donnelly calls attention to the fact that "the present administration will see to it that the evil is corrected as it rightfully should be, and in such a manner that the new policy to be pursued will be so plain and open that it cannot be misunderstood."

STATISTICS OF WATER WORKS OF THE UNITED STATES

TABLE NO. 3.—DISTRIBUTION SYSTEM

| | | | | Indi | LL 141 | J. J | -010 | MIDC | 11014 | 213 | LEIVI | | | | 2011 | | 1 |
|----------------------------------|-------------------------|-------|----------------|-------------------------|---------------------------|-----------------------------------|----------------------------------|------------------------------|--|--------------------|--------------|--|------------|---------|-------|----------------|-------------------|
| | | | | ъ. | | | | | Length | No. hy | drants | No | stop gat | ės- | | Pr | ess- |
| Name of city. | Kind of pipe | of p | oipe, | Ex- | Discon- tinued, ft. | Total now in use, miles. | Cost, repairs per mile. | No. of leaks per mile. | of pipe less than 4" diam. mls. | Added during year. | in . | Added | in | Smaller | blow- | on n | re nains |
| Alabama: Mobile Troy | C. i. & gal. | | 30 10 | 16,538 | | 158.5 | | | 22.5 | 6 | 974 60 | year. | 898 25 | 4-in. | offs. | From 81 35 | 50 |
| Arkansas: Helena Rogers | C. i. | 4 | 12 | 1,500 2,000 | | 16 19 | | Few. | 2 13 | 1 26 | 150 840 | 6 | 86 | 49 | | 60 35 | 125 |
| California: Pomona Stockton | | 4 | 20 | | | 100 88.5 | | | 33.1 | | 3,000 250 | 4 | | | · | 35 40 | 50 |
| Colorado: | St. & c. 1. | 2 | 18 | 7,600 | 7,600 | ••• | * * * * * | | 2 | 65 | 65 | | | | | 40 | 50 |
| Greeley Las Animas | St.,c.i.,wd. | 4 | 24 20 12 | 74,647 5,000 | 7,508 | 7.5 | \$2.86 | | 21.9 | 50 | 78 | 184 | 1,856 | 389 | 114 | 40 40 55 | 90 |
| Victor | C. i., wd. C. i. | 4 | 10 12 | 800 | | 9.46 128 | 50.00 | 2 | ***** | • • • • • | 30 | 2 | 31 | • • | 7 | 78 129 | 118 |
| Meriden | C. i. | 2. | 20 20 20 | 7.200 1,414 2,828 | | 50* 36 38.5 | 7.00 | 32 | i | 3 3 | 218 132 | | 337 301 | 21 | 44 | 40 | 140 |
| New Britain | C. i. | 4 | 30 | 12,000 | | -85 | 236.00 | 2 | | 20 | 1,180 | 59 | 587 | | 50 | 20 | 115 |
| New London | C. i., gal. | 41 | 24 | 9,506 25,550 | 24,949 | 66.4 59 | 1.79 26.00 | 0.06 | 3.7 | 3 | 379 461 | 7 | 551 | | 38 | 20 15 | 100 110 |
| South Norwalk Winsted Delaware: | C. i. | 14 | 20 24 | 1,783 1,045 | | 44.8 23 | 2 | 2 | 0.6 | 3 | 250 242 | 9 | 300 | | 7 | 25 40 | 90 145 |
| Dover | C. i. | 4 | 14 | 1,325 | | 6 | | | 0.25 | 5 | 50 | 4 | | | | 50 | 100 |
| Milford | C. i., ld., lk. bar. | 1 | 10 48 | 10,880 | | 132.12 | 2.23 | * * * * * | 2.54 | 6 | 75 929 | 65 | | • • • | • • | 50 20 | 90 95 |
| Florida: Daytona Pensacola | W. 1. | 11/2 | 10 | 4,100 | | 9 | 1.00 | | 1.4 | 2 | 67 | 9 | 81 | 21 | 1 | 48 | 90 |
| Georgia: | | 6 | 12 | 28,000 | | 37 | | | 1.5 | 36 6 | 243 | 16 | 180 | • • | | 60 | 65 145 |
| Cedartown | C. i., gal. | 4 | 10 | 1,000 | | | | | | 8 | 80 | 10 | | | | 60 | 90 |
| Fort Valley | C. i. | 4 | 10 10 | 3,000 600 | | 4.5 | | Few. | | 8 | 35 79 | 6 | 21 | | | 40 60 | 75 |
| Rome | | 6 | 16 10 | 16,000 | | 3 | 5.00 | 10 | | | 60 | | 20 | | | 50 30 | 80 40 |
| Waynesboro | C. i. | 6 | 10 10 | 800 | | 3.5 2.5 | | | 3 | i | 35 31 | i | 23 11 | 15 | | 45 | 120 60 |
| Idaho: Moscow | C.i.,st.,wd. | 4 | 12 | | | • • • | | | **** | | | | | | • • | 86 | 112 |
| Aurora | C, i. C, i. | 4 2 | 16 12 | 20,953 | | 74.88 6 | | | 1.5 | 31 | 601 | 48 | 652 | | 6 | 60 | 78 100 |
| Belleville | W. i., c. i. | 1 | 20 | 2,500 | | 65 | | | 10 | 6 | 3.30 | | * * * * * | | 6 | 20 | 200 |
| Champaign-Urbana, | C. i. | 4 | 10 | 6,200 | | 84 | 50.00 | 10 | 6 | 15 12 | 350 359 | 15 14 | 350 204 | | 12 | 35 40 | $\frac{120}{100}$ |
| Chicago Elgin | | 4 | 48 24 | 375,790 7,000 | | 2,362.48 70 | 0.21 | 0.05 | 0.84 | 1,090 | 24,897 | 673 | 20,488 | | | 20 | 65 |
| Hinsdale | C. i. | 4 | 10 | 1,000 | | 20 | | | | 10 | 100 | 5 | 50 | | | 40 | 50 |
| Lake Forest | C. i. | 4 | 12 | 2,010 | | 18 20 | 2.16 | 1 | | 2 | 214 120 | 3 | 157 | | | 25 30 | 110 60 |
| Marshall | | 4 | 8 | | | | | | | | | * * * * * * | | • • | | 40 45 | 50 53 |
| Moline | C. i. | 3 | 16 | 11,552 | | 41 | 25.00 | | 0.1 | 24 | 384 | 16 | 277 | | | 40 | 110 |
| Monticello | C. i. | 4 1/2 | 6 10 | 1,500 | | | | | | | | | | | | | |
| Oak Park | | 6 | 16 | 10,037 | | 30.35 10 | | 1 | | 31 | 319 72 | 11 | 178 14 | | | 60 | 90 60 |
| Peoria | C. i | 4 | 30 | | | 105 | | | | 32 | 1,386 | | 810 | | | 25 | 115 |
| Rockford | C. i., w. i. | 4 | 20 24 | $15,890 \\ 34,282$ | 600 | 102.86 | | | $\frac{2.6}{9.26}$ | 14 76 | 617 | $\begin{array}{c} 19 \\ 147 \end{array}$ | 1,153 | 143 | 35 | 60 | 120 90 |
| Rock Island St. Charles | C. i. | 1 4 | 20 10 | | | 15 | 2.00 | 1 | | | 375 80 | | 50 | | | 30 | . 75 |
| Streator | C. i. | 4 | 20 | 2,000 | | 36.75 | 0.42 | | 5 | 3 | 291 | 4 | 281 | 27 | 4 | 45 | 72 100 |
| Indiana: Auburn | C. i. | 4 | 12 | | | 11 | 3 | 3 | | | | | | | | 40 | 80 |
| Brookville | C. 1., W. 1. C. i. | 2 | 10 16 | 15,000 | | 18 | 5.5 | 5 | | 89 | | 6 | 3 | • • | | 65 | 80 100 |
| East Chicago | C. i. | 6 | 16 24 | 26,000 | | 36.2 45 | 15.00 | | | 16 28 | 288 | | . 236 | | i | 30 | 70 |
| Garrett | C. i. | 2 | 12 | | | 7.2 | 2.00 | 1 | 0.1 | | 326 | | 37 | 3 | 18 | 50 40 | 100 80 |
| Gas City | C. i. C. i. | 4 | 12 12 | 200 | | 3 12 | 2 | | 0.5 3 | 4 | 90 | | 10 30 | 10 | • • | 30 40 | 120 90 |
| Jeffersonville | C. i. | 6 | 14 | 2,000 | * * * * * | 12 | | * * * * * | | 2 | 145 | 2 | 44 | | | 45 | 100 |
| Madison | C. 1. | 4 | 12 12 | | | 12 | | | 4 | | 74 | | , | 20 | | 60 | 90 |
| N. Manchester Richmond | | 3 | 20 | | | 7 40 | | | | 3 | 70 342 | 5 | 341 | 86 | | 47 | 100 125 |
| Rochester | C. i. | 4 | 12 | 1,200 | | 8.25 | ***** | 2 | | 4 | 100 | 1 | 55 | | | 40 | 125 |
| Rockport | C. i. | 4 | 10 | 2,000 | | 6 12 | 80.00 | 2 | 1.5 | 6 | 37 119 | 9 | 100 | | | 35 30 | 100 |
| Shelbyville | C. i. | 21/2 | 16 16 | 2,000 23,750 | 883 | 16 83.8 | * * * * * | | 0.8 | 23 | 1,058 | | | • • | ** | 55 | 110 |
| Tipton | C. i., W. i. | 11/4 | 12 | 300 | ***** | 16 | | | 3 | 1 | 84 | 1 | 300 | - :: | 3 | 70 25 | 130 120 |
| Valparaiso | C. i. | 6 | 12 24 10 | 900 | | 20 | ***** | | | 1 | 136 280 | 4 | 105 | | • | 40 | 90 |
| Iowa: | | | | * * * * * | * * * * * | | * * * * * | | | | | | 90 | ••• | ••• | | |
| Atlantic Boone | C. i. | 4 | 18 14 | 10,000 | | 15 17 | | | 5 | 40 | 212 | 20 | 25 120 | 20 | iò | 40 | 150 120 |
| Burlington | C. i. | 4 | 16 | 14,840 | | 44.99 | | 1 | | 20 | 457 60 | | 6 | | | 35 40 | 140 |
| Cedar Falls | C. i | 4 | 10 | 3,000 | | 17 | | ***** | | 5 | 113 | 7 | | | | 70 | . 90 |
| Dubuque | C, i. | 4 | 24 10 | 7,455 1,000 | | 11 | 10.00 | | 1 | i | 500 60 | 2 | | * * * | * * | 20 | 160 125 |
| Muscatine | C. i. | 6 | 10 16 | 2,200 13,200 | 100 | 6.5 | | | | 30 | 55 333 | . 33 | 346 | | 2 | 45 | 100 |
| Mt. Pleasant | C. i., w. i. | 2 | 10 | 3,690 | | 10 | | | | 6 | 72 | . 4 | 36 | | // 1 | 35 | 110 |
| Shenandoah | C. I. | 4 | 10 | 1,500 | * *** * | 12.5 | | 4 | ***** | 10 | 93 | 4 | 34 | 31 45 | 11. | 60 | 69 |

STATISTICS OF WATER WORKS OF THE UNITED STATES

TABLE NO. 3.—DISTRIBUTION SYSTEM (Continued)

| | | 17 | ADI | TE 140 | , ,,_ | -DIST | KIDO | | Length | | drants | | stop gate | PS | | Pre | -88- |
|--------------------------------------|---|--------------|----------|-------------------|----------------|-------------------|------------------|---------------|---|----------|--------------|--------------|--------------|---------------|----------------|-----------|------------|
| | | Siz of pi | | -Durin | g year | Total | Cost, repairs | No. of | of pipe less | | Now | Added | | Smaller | Nc. | on m | e |
| Name of city. | Kind of pipe | From | - | tended, | | in use, miles. | per mile. | leaks per | than 4" diam. mls. | during | in use. | during year. | in use. | than 4-in. | blow- offs. | From. | S |
| Iowa (Continued): | | 4 | 8 | | | 4.5 | 2.00 | | | | 43 | | 22 | | | 60 | 125 |
| Vinton | .C. i. | 4 | 12 , | • • • • • • | | 7.5 | ***** | | | | 36 | | | *** | | 70 | 100 |
| Atchison | .C. i., w. i. | 2 | 14 10 | 1,000 | | .33 | | 2 | 4.95 | 1 | 180 45 | 8 | 228 55 | 48 | 4 | 40 25 | 130 55 |
| Coffeyville Hoisington | . C. i., gal. | 2 | 10 | 5,150 25,000 | 900 | 33.73 | 12.00 | 2.5 | 2.27 | 30 | .175 50 | 10 21 | 120 45 | 13 | 2 | 20 35 | 60 50 |
| Horton | .C. 1. | 4 | 10 | 3,200 | | 6 16.5 | | | 0.25 | 2 | 127 | 4 | 65 | 3 | | 60 | 95 110 |
| Kentucky: | | | | | | | | | | | | | | | | | 212 |
| Danville | . C. i. | 4 | 8 | | | 12.33 | | | 3 | 28 | 114 | 4 | 57 11 | | 2 | 35 | 65 |
| Lexington Louisville | . C. i. | 3 | 48 | 50,268 104,262 | 1,603 | 72.3 367.67 | 72.60 | 1.95 | 2.22 | 17 86 | 610 1,191 | 60 252 | 703 5,482 | 178 | 30 | 50 | 120 75 |
| Paris | , C. i, | 4 | 12 | | | 8 | 3 | 1 | • • • • • | | 114 | | 90 | ** | 3 | 50 | 100 |
| Bangor | .C. i. gal. | 4 2 | 24 | 5,752 14,047 | | 52.5 63 | 5.98 | 0.25 0.125 | 1.5 19 | 11 15 | 300 286 | 14 | 496 | 40 | 15 | 21 25 | 125 85 |
| Brewer | . C. i., w. i. | 2 | 12 12 | 500 | | 20 | a | 3 | **** | 1 | 60 130 | ····i | | | | 85 100 | 110 |
| Ellsworth Gardiner | . C. i., w. i. | 1 | 10 | 8,500 | | 18 | | | 4 | 2 | 56 67 | 20 | 130 | 52 | 15 | 80 | 120 115 |
| Hallowell | . C. i. | 6 | 12 24 | 10,000 | | 47 | | | | 14 | 50 400 | 7 | 55 400 | | 4 7 | 35 23 | 110 |
| Pittsfield | .C. i. | 4 | 10 | 800 | | 9 | | 1 | 0.5 | 2 | 87 84 | 2 | 49 | 5 | 2 2 | 60 | 80 80 |
| Skowhegan Maryland: | | • | | • • • • • | | | | | | | | | | | | | |
| Baltimore Easton | .C. i. | 4 | 8 | 80,808 | 18,700 | 723.25 | ***** | | 118.6 | 84 | 3,438 45 | | | | 612 | 25 45 | 130 100 |
| Massachusetts: Boston | .C. i. | 2 | 48 | 270,957 | 27,840 | 818.42 | | | 2.17 | 416 | 8,824 | 813 | 11,109 | 21 | 537. | 30 | 90 |
| Brockton Brookline | .C.i.,cmt.Inc | 1.6 | 30 | 10,465 9,485 | 1,870 1,724 | 114.72 | 1.42 | 0.1 | 12.28 | 15 15 | 1,046 | 57 | 1,628 | 211 | 49 | 68 30 | 72 110 |
| Cambridge | . C. i. | 2 | 40 16 | 4,092 2,324 | | 132 36.6 | 6.55 | 17 0.3 | 2 4.3 | 13 | 1,085 282 | 39 | 195 | 55 | 26 | 55 8 | 60 120 |
| Clinton | ind we | 1 | 16 | 12,906 | 167 | 44.07. | | 0.38 | 0.36 | 15 | 210 | 10 | 255 | | . 32 | 25 | 110 |
| Danvers | C.i,cmt.lnc . C. i., gal., cmt. lnd | 2 | 18 24 | 11,165 | | 58 48.21 | | | 2 1.3 | 10 | 285 532 | | 457 | | 1. | 25 40 | 110 110 |
| Fitchburg Framingham | .C. i. | 4 34 | 30 16 | 12,572 | 2,040 | 39.32 | | | 4,09 | 37 15 | 616 230 | 25 38 | 57.0 499 | 110 52 | 44 | 60 | 180 |
| Gardner | . L I W. I. | 1 2 | 16 | 6,822 9,695 | 905 | 28.53 | 19.94 | 1.37 0.5 | 3.98 | 14 10 | 225 336 | 16 26 | 197 572 | 15 176 | 28 | 45 15 | 140 75 |
| Haverhill | . C.i., cmt.lnd | 1. 2 | 24 | 15,540 | | 96.77 | | | | 6 | 373 856 | 84 52 | 1,161 | iż | 43 | 30 25 | 120 115 |
| Holyoke Lynn | . C. 1. | 4 | 16 | 6,172 6,298 | 4,228 | 91.52 149.3 | 15.26 | 0.09 | 5.88 | 29 | 1,233 | 32 | 1,032 | | 8 | 45 | 70 70 |
| New Bedford | .C. 1. .C. i., st. | 4 | 12 48 | 4,061 67,815 | 25,968 | 20.04 144.9 | 7.38 | 0.06 | 0.86 | 124 | 135 1,485 | 179 | 1,822 | 111 | 149 | 25 | 95 |
| Newburyport Newton North Adams | .C.i.,cmt,lnc | 1. 2 | 14 20 | 4,136 8,476 | | 40 148 | 1.00 1.00 | 0.15 | 9.4 3.6 | 7 | 243 1,012 | 10 | 896 | 54 | 446 | 35 10 | 120 |
| Northampton | . C. 1. | 3 | 24 | 3,689 | | 43 69.5 | 23.10 | | 0.42 | 19 | 383 | 3 | | • • • | 12 | 40 | 170 120 |
| North Attlebora Peabody | .C. i | 2 | 16 24 | 2,622 6,336 | 3,646 | 26.65 43 | | 1.65 | 2.88 | 7 2 | 255 384 | 6 13 | 338 | 6 36 | 13 | 30 30 | 110 85 |
| Reading | .C. i. | 6 | 12 | 1,636 | | 6.06 | 2.39 | 0.49 | | 2 | 137 | 4 | 288 427 | | 14 10 | 63 20 | 73 72 |
| Revere | cmt. Ind | . 4 | 16 | 11,170 6,762 | 2,924 | 48.75 95.82 | 5.53 | 0.43 | 5.5 | 20 | 1,140 | 36 50 | 1,519 | | 152 | 35 | 100 |
| Springfield Taunton | . C.i., w.i., st. | 1 | 54 20 | 46,778 | 14,432 | 188.87. 89:71 | | 0.17 | 6.76 | 59 12 | 1,500 | 284 | 3,896 695 | 630 12 | 63 | 86 50 | 144 |
| Turners Falls Waltham | .C. i. | 3 | 14 24 | 300 4,762 | | 20 55.8 | 5 | 0.4 | 2.5 | 2 11 | 98 466 | 1 16 | 103 836 | 46 | 67 | 50 60 | 136 80 |
| Wellesley Westfield | .C.i.,cmt.lnc | d. 11/5 | 12 | 7,673 12,301 | 801 | 39.3 | 0.60 | 0.6 | 1.2 0.25 | 13 16 | 254 250 | 9 24 | 303 | | 3 15 | 35 115 | 125 |
| Michigan: | | • | | | ***** | ••• | | | | | | | | | | 30 | 100 |
| Alpena | .C. i., wd. | 4 | 24 16 | 22,000 | | 33 62 | \$36.36 2.90 | 0.5 | 0.5 | 40 | 660 | 34 | 524 | 10 | 1 | 40 | 87 |
| Detroit | .C. 1. | 2 2 | 16 48 | 1,200 225,871 | 42,616 | 21.3 809.8 | 293.33 2,68 | 0.14 | 11 | 258 | 5,596 | 507 | 8,596 | 20 | 953 | 60 | 100 |
| Greenville | . C. i. | 3 | 16 12 | 1,500 1,200 | | 20 10 | 3.00 | 0.2 | 1.2 | 2 | 65 | 64 | 180 64 | | | 60 | 150 80 |
| Holland | . C. i. | 2 | 12 10 | 200 | | 27.7 | 2.45 | . 0.18 | 0.18 | 9 | 267 | 10 | 98 | 2.4 | | 40 | 60 |
| Ishpeming Lansing | Wd. . C. i. | · 4 | 14 16 | 1,690 42,000 | | 27 80* | 2.00 | | 1.25 | 15 | 137 480 | 60 | 648 | 20 | | 30 48 | 90 65 |
| Manistique Marquette | . C. i. | 4 | 20 | 550 | | 8.5 22 | | | 1 | 4 | 210 | 12 | 263 | | | 45 | 125 125 |
| Marshall Mt. Pleasant | . C. i. | 4 | 12 12 | 1,200 | | 12 16* | | | | 5 | 85 | 4 | 50 | | | 40 | 100 |
| Muskegon | C. i., gal., kal., wd. | 55 | 24 | 5,316 | | 51.2 | | | 1.5 | | 621 | | 459 | 19 | • • • | 35 | 70 |
| Saginaw Ypsilanti | . C. i., w. i. | 11/4 | 30 16 | 13,200 2,000 | | 28* | | | 0.5 | 20 | 935 170 | 6 | 848 291 | 113 | 26 | 50 | 95 94 |
| Minnesota: Brainerd | . C. i., kal. | 4 | 12 | 6,600 | 400 | 15 | 2,22 | 1.67 | 0.4 | 15 | 105 | . 6 | 50 | | 2 | 15 | 25 |
| Duluth | . C. i., st. | 6 | 16 | \$1,519 | | 127 12 | 98.40 | | 0.3 | 55 12 | 877 | 25 | 85 | | . 10 | 70 | 140 |
| Faribault | . C. i., w i. | 1 1/2 | 12 8 | 3,914 | 410 | 18.5 | 25.00 | | 0.8 | 4 | 112 | | 273 6 | ** | 1 | 60 65 | 96 |
| Mankato Marshall | . C. i. | 4 | 16 10 | 840 | | 19.6 | | | 2.4 | 2 | 178 38 | 2 | 112 | | 9 | 55 | 60 |
| Northfield Owatonna | .C. i. | 4 | 12 10 | 1,400 | | 8.6 | 5 | | | 4 | 105 | 6 | 250 | ** | 6 | 60 70 | 110 |
| Worthington | .C. i. | 2 | 10 | 6,000 | | 4* | | | 0.5 | 6 | 30 | 3 | 18 | 5 | 5. | ** | 100 |
| Bay St. Louis Greenwood | . C. i. | 2 | 16 | 1,000 | | 12 | 5.00 | 2 | 11 | 2 | 39 | 1 | 8 | 5 | | 15 50 | 120 |
| Natchez | . C. i. | 11/2 | 12 | 5,932 400 | 3 | 24 | 13.00 | | | 7 | 182 | 1 | 125 | | 4 | 40 15 | 135 |
| Yazoo City | | 4 | 18 | | · · · · · . | 14.5 | 3 | 3 | • | **** | 200 | ***** | 100* | | 6 | 100 | 110 |

For footnotes, see page 11.

STATISTICS OF WATER WORKS OF THE UNITED STATES TABLE NO. 3.—DISTRIBUTION SYSTEM (Continued)

| | - | | | | 2101 | | | Length | No. hy | drants | | . stop gat | | | Pre | ec. |
|--|--------|----------|-------------------|--------------------|--------------------|-----------|---------------------|-----------------|---|---------------------|-----------------|---------------------|----------|---|----------|-------------------|
| | | ze | | ng year | Total | Cost, | No of | of pipe | | | - | | | No. | uı | re |
| Name of city. Kind of | -in | pipe, | tended, | Discon- tinued, | now in use, | per | No. of leaks per | less than 4" | Added | in | Added during | in | than | of blow- | -lb | s |
| Missouri: pipe | Fron | n. To | . ft. | it. | miles. | mile. | mile. | diam. mls. | year. | use. | year. | use. | 4-in. | offs. | From | . То. |
| BrookfieldC. i. ButlerC. i. | 4 | 10 | 3,000 | * **** | | * | | | 25 | 54 94 | 1 | 12 39 | | 4 | 65 25 | 100 |
| Caruthersville C. i. | 4 | 8 | 3,000 | ***** | 4.6 | | | | 25 | 350 | 2 | 8 | | | 50 | 75 |
| FarmingtonKal. HannibalC. i., w. i | 11/4 | 14 | 1,790 | | 3.5 29.62 | | 3.5 | | | . 115 | 12 | 10 251 | 6 | 7 | 10 | 125 |
| Kansas CityC. i. | 2 | 36 8 | 169,752 | | 470 | | | 7.5 | 425 | 5,759 | 492 | 5,342 | | | 30 | 150 |
| Pierce CityC. i. St. LouisC. i. | 3 | 48 | 67,850 | 2,060 | 916.33 | 3 | 2 | 1.9 | 288 | 12,678 | 189 | 12,452 | 2,404 | 178 | 60 16 | 70 115 |
| Nebraska: | | 0 | 1 000 | | | | | | 10 | 950 | | | | | 20 | 05 |
| AshlandC. i., st. ChadronC.i.,kal., | vd. 4 | 10 | 1,000 35,000 | * *** * | 3 14 | 3,65 | 2 | 1 | 12 22 | 350 73 | 16 | 14 58 | 6 | 6 | 60 90 | 65 112 |
| Grand IslandC. i. LincolnC. i. | 4 | 24 | 15,000 | 13,000 | 30 75 | 5.00 | 1 | | 21 | 115 653 | 8 | | | | 30 50 | 150 100 |
| Reno and Sparks C.i., w.i., | vd. 2 | 22 | 11,564 | 2,610 | 52.77 | 160.00 | | 13.7 | 10 | 142 | | | | | 60 | 95 |
| New Hampshire: ClaremontC.i.,cmt.l | nd. 4 | 12 | 3,184 | 883 | 21.25 | 29.9 | 0.05 | 4.5 | 3 | 111 | . 12 | 256 | | 7 | 70 | 130 |
| Concord | nd. 2 | 24 | 3,633 | 614 | 68.54 | | | 3.23 | 13 | 480 | 22 | 982 | | 82 | 48 | 88 |
| DoverC. i. KeeneC.i.,cmt.l | nd. 4 | 16 24 | 800 1,612 | | 28 42.5 | 37.85 | 0.28 | 3.75 | 3 | 217 | 3 2 | 271 416 | | 8 31 | 68 | 90 |
| Newport | 4 | 12 | 1,500 | | 19.5 | | | * * * * * | 1 | 82 | | | | 13 | 20 | 140 |
| New Jersey: East OrangeC. i., w. i | . 2 | 24 | 21,351 | | 87.93 | | | 0.28 | 75 | 669 | 172 | 1,460 | 5 | 10 | 55 | 125 |
| Kearny | 4 | 10 12 | 5,000 | | 40* 20 | | * ** * * | 0.5 | | 500 | **** | | 4 | 25 | 65 30 | 109 120 |
| Millville | 4 | 16 | 2,500 | | 17 | | | * *** * | | 71 | * * * * * * | | | 12 | 45 | 60 |
| Newark | 4 | 60 20 | 39,278 13,047 | | 387.8 52.16 | 3.40 | | | 78 13 | 2,989 340 | 371 26 | 5,429 956 | | 25 | 25 7 | 160 53 |
| Paterson | 1d. 6 | 42 | 26.000* | | 144 | 2 | 2 | | 24 | 1,462 299 | | | | | 30 | 70 70 |
| Perth AmboyC. i. RidgewoodC. i. | 4 | 16 | 8,660 18,000 | | 56.88 41 | | | | $\begin{array}{c} 10 \\ 20 \end{array}$ | 128 | 12 | | | 10 | 30 40 | 105 |
| VinelandC. i. WashingtonC. i. | 3 | 10 10 | 2,600 | | 14 | 2 | 2 | 2 | 1 | 41 | | | | | 30 75 | 70 80 |
| New Mexico: | - | | 2,000 | | | | | | - | •• | | | | | | 0.7 |
| AlbuquerqueKal. | 4 | 10 | 24,000 | | 26 | | | * * * * * | 40 | 215 | 25 | | * * | * * | 60 | 95 |
| New York: BaldwinsvilleC. i. | 4 | 12 | 600 | | 20 | 4.00 | 2 | | | 78 | 1 | 27 | | 3 | 65 | 87 |
| BuffaloC. i., w. i | 1 11/2 | 30 60 | 9,757 40,960 | 2,770 | 92 555.25 | 0.63 | | 2 | 12 75 | 837 5,210 | 29 313 | 1,404 9,742 | 34 25 | 30 54 | 65 25 | 85 75 |
| Canandaigua C. i., w. i. | 1 | 16 | 1,190 | | 24.5 | 635.26 | 1.5 | 1.5 | 3 | 192 | 8 | 230 | 2 | 6 | 55 | 126 |
| Carthage | 4 | 12 12 | 1,100 2,175 | | 30 14 | | 0.25 | 0.5 | 1 | 95 130 | 3 6 | 60 140 | 2 | 3 | 75 50 | 105 |
| CooperstownC. i. | 3 | 10 18 | 1,500 | | 6* 25 | 2.97 | 0.3 | * * * * * | 3 9 | 57 208 | 6 | 200* | 3 | | 30 68 | 90 77 |
| Deposit C. i., w. 1 | | 8 | 2,478 | | | 2.91 | 0.3 | | | 48 | | | | | | |
| Dunkirk | 3 | 24 | 3,500 | | | | | * * * * * | 6 | 156 | | | • • | • • | 55 | 100 |
| New Rochelle C. i. | 4 | 24 | 29,040 | * * * * * | 138 | 29.24 | | | | 833 | | | | 24 | 25 | 90 |
| Pelham C. i. | 2 | 30 | 18,381 | 4,737 | 87.62 | | | 5 | 5 | 509 | 37 | 823 | 84 | | | |
| FairportC. i. FrankfortC. i. | 4 2 | 10 12 | 2,815 400 | | 7.0 8.75 | *3.00 | | 0.25 0.25 | 1 | 78 49 | 5 2 | 60 36 | 4 | 2 | 75 65 | 85 105 |
| GeneseoC. i. | 4 | 12 | 140 | * * * * * | 12.25 | 3.00 | 2 | | | 90 | | 63 | | 4 | 40 | 160 |
| Glens FallsC. i., w. i. | 2 | 24 | 5,240 | | 47 | 721.83 | 1.2 | 0.5 | 10 | 381 20 | 24 | 433 | | • • | 85 70 | 105 |
| HudsonC. i. JamestownC. i. | 3 | 18 18 | 2,150 9,640 | * *** * | 27.5 60 | | | 0.5 25 | 18 | 175 465 | 10 23 | 150 | 2. | 10 | 40 10 | 130 115 |
| Lestershire C. i., w. i. | 4 | 12 | 1,500 | | | | | | 2 | 53 | 7 | | | • • • | 65 | 80 |
| LowvilleC. i. MaloneC. i. | 4 | 14 | 13,252 | | 23 35.25 | 3 | 3 | | 3 | 106 104 | 5 | 408 | 4 | 10 | 75 40 | $\frac{160}{135}$ |
| MiddletownC. i. | 4 | 24 | 2,098 120 | | 44 | 10.00 | | | 3 | 345 55 | . 2 | 345 52 | 3 | 19 | 40 70 | 90 90 |
| MohawkC. i. NewarkC. i. | 4 | 12 | 2,073 | | 5.5 18* | 7.20 | 3 | 0.3 | 4 | | 3 | | | | 60 | 75 |
| NewburghC, i. N. Tonawanda Wd., c. i. | 2 | 30 24 | 3,168 | | 43.12 48 | | 1 | | 7 | 396 | 13 | 573 | | 7 | 40 40 | 120 80 |
| Oneida | 4 | 18 | | | | | | | | 120 | | | * * | 6 | 84 | 92 |
| Poughkeepsie C. i. | 6 | 20 18 | 15,000 | | 36.5 | *3.00 | | | 42 | 700 | | | ** | | 40 | 160 |
| SalamancaC. i., w. i. SchenectadyC. i., st. | 1 4 | 12 36 | 1,643 19,000 | * * * * * | 13.9 93 | 2 | 3 | 2.17 | 3 44 | $\frac{93}{1,340}$ | 98 | $\frac{113}{2,166}$ | 11 | 2 | 45 | 100 95 |
| Sidney | 4 | 10 | | | 13.26 | 3 | 0.25 | | | 49 | | 81 | 3 | 8 | 80 | 115 |
| Solvay | 4 | 12 33 | $3,000 \\ 7,392$ | | $\frac{12}{112.1}$ | | | | 5 19 | $\frac{130}{1,200}$ | 8 | 2,500 | | $\begin{smallmatrix} 1\\264\end{smallmatrix}$ | 40 50 | 130 100 |
| Whitehall | 4 | 12 | 1,200 | | 8.5 | 15.00 | 3 | * * * * * | 3 | 87 | 3 | 45 | | 5 | 85 | 110 |
| North Carolina: Elizabeth City C. i. | 4 | 10 | | | 7.5 | 5 | | 4 | | 92 | | 56 | | 6 | 35 | 110 |
| WashingtonC. i. | 4 | 12 24 | 2,800 | | 9 31,25 | 4.00 | | | 5 | $\frac{70}{230}$ | 4 | 43 277 | | 3 6 | 50 64 | 60 75 |
| Ohio: | 4 | 23 | 2,000 | | 31,25 | 4.00 | | | 9 | 230 | | ~ • • | | U | 0.1 | 10 |
| Barnesville C. i. Canal Dover C. i. | 4 | 12 12 | 880 | **** | 8 16 | | | 1.5 | 2 | $\frac{80}{129}$ | 1 | 100* | • • | 2 | 60 | 130 110 |
| Cincinnati C. i. | 3 | 60 | 224,5588 | 12,413 | 650.5 | 44.29 | 0.46 | 11.63 | 206 | 3 | 536 | 2 | 9 2 | 2 | 10 | 175 |
| ClevelandC. i. CovingtonC. i. | 3 | 48 12 | 123,520 990 | 16,472 | 787.4 6* | 5.64 | 0.33 | 3 | 221 | 9,315 60 | 444 | 17,459 36 | 2 | 1. | 30 56 | 138 65 |
| DelawareC, i. | 4 | 16 | | | 23.5 | | 0.2 | | | 262 | | 1,800 | | | 50 | 70 |
| Eaton | 4 | 12 10 | 772 | | 11.25 3.5 | 2.00 | | | 1 | 88 390 | | | | 35 | 50 15 | 70 50 |
| LeetoniaC. i. PortsmouthC. i. | 4 | 12 16 | * * * * * | * *** * | 10 | | | | | 85 | | | | 4 | | |
| SalinevilleC. i | 2 | 8 | 1,500 | * * * * * | 7.5 | 7.00 | 0.5 | 4.5 | | 53 | 3 | 18 | 7 | 7 | 40 | 130 |
| ToledoC. i. WashingtonC. i. | 4 | 30 14 | 54,207 | | 257.5 16 | 4.00 | 0.12 | | 57 | 1,870 145 | 135 | $^{1,977}_{80}$ | | 16 | | 75 100 |
| WaverlyC. i. YoungstownC. i. | 4 | 10 20 | 38,000 | | 5 142 | | | | 81 | 1,418 | * * * * * | | | | 85 | 90 140 |
| Oklahoma: | * | | 00,000 | | 1 10 | * * * * * | ***** | * * * * * | 01 | -, | | | | * * | | 110 |
| Davis | 4 2 | 8 | 600 | | 27.06 | * * * * * | | 1 | | 178 | | 160 | 20 | 3 | 50 65 | 55 90 |
| Oregon: | | | | * * * * * | ~1.00 | | * * * * * | * * * * * | | | | | | | | |
| PortlandC.i.,st.,wd | 2 | 30 | 882,045 | 93,213 | 518.83 | * * * * * | | 127.93 | 623 | 3,179 | 1,483 | 4,733 | 297 | 170 | 20 | 80 |
| Pennsylvania: AllentownC. i. | 2 | 30 | 10,503 | | 71.9 | 3 | 0.2 | 3.86 | 15 | 519 | 60 | | | | | 100 |
| BradfordC. i. CarbondaleC. i. | 4 2 | 24 | $3,000 \\ 16,000$ | | 38 55 | | 2 | 5 | 10 | 282 140 | 100 | 480 | 50 | 10 | 85 75 | 90 175 |
| Franklin | 3 | 12 12 | 40,000 | 40,000 | 50 | 6 | | 10 | 3 | 85 | 10 | | | 20 | | 125 |
| GettysburgC. i. | 4 | 10 | 2,000 | | 15 | * * * * * | | | | | | ***** | | 1 | 20 | 45 |

STATISTICS OF WATER WORKS OF THE UNITED STATES TABLE NO. 3.—DISTRIBUTION SYSTEM (Continued)

| Name of city Kind of pipe Parting years The pipe The pipe | | | | | | | | • | Length | No. hy | drants | No. | stop gat | es | ** | | ess- |
|--|-------------------------|--------|---------|------|--------------------|---------|-------|-----------|-----------------|--------|--------|--------|----------|--------|-------|------|-------|
| | | of pip | e, E | ded, | Discon- tinued, | in use, | per | leaks per | less than 4" | Added | in | during | in | than | blow- | on r | nains |
| Harrisburg C. i. 6 42 75,2738 | | From. | 10. | ıt. | It. | miles. | mue. | mue. | diam. mis. | year. | use. | year. | use. | 4-1II. | ons. | Fron | . 10. |
| Honesdale C. i. w. i. 14 13,000 14 1 20 1,000 30 120 21 40 100 Huntingdon C. i. w. i. 14 12 500 18 3 0. 120 21 40 100 Huntingdon C. i. w. i. 14 12 500 18 3 0. 120 0. 12 40 100 110 110 110 110 110 110 110 110 | HarrisburgC. i. | 6 | 42 75 | .278 | | 86 | | 0.04 | | 61 | 1.051 | 188 | 1.895 | | 8 | 30 | 70 |
| Huntingdon C. i., wi. 1 12 2500 18 0.5 3 49 4 67 7 65 100 Indiana C. i., wi. 2 13 2,000 17 2 0.0 McDonald C. i., wi. 2 10 2,100 8.28 1.00 0.6 1.32 2 24 2 30 3 77 120 McDonald C. i., wi. 2 10 2,100 8.28 1.00 0.6 1.32 2 24 4 2 30 3 77 120 McGia C. i. wi. 2 10 2,100 8.88 1.00 0.6 1.32 2 24 4 2 30 3 77 120 McGia C. i. 4 8 500 8 8 0.04 32 2 30 4 40 70 110 McGia C. i. 4 8 500 8 8 0.04 32 30 4 40 70 110 Philadelphia C. i. 6 60 148,116 1.517 1.704.7 0.0 281 10,569 0.0 30 2.066 3 10 110 Reading C. i. 2 36 4,400 3,906 114.9 13.02 0.75 0.4 6 976 39 2.066 3 10 133 Shenandosh C. i. 4 12 13 13 130 130 130 130 Rayguanna C. i. 4 16 1,250 37.38 0.35 2 191 8 245 23 40 92 Woonsocket C. i. 4 20 13,418 5,678 58.68 2.97 0.08 170 19 677 67 687 16 50 120 South Cargina: Florence C. i. 4 8 2,500 11.5 3 3 3 4 68 3 40 92 Vankton C. i., wd 4 10 7,000 12 4.50 0.1 9 76 6 34 6 6 6 125 Vankton C. i., wd 4 10 1,210 11 0.3 0.3 5 3 10 5 11 12 13 14 Vankton C. i., wd 4 10 1,210 11 0.3 0.35 3 3 10 10 10 10 10 10 | HonesdaleC. i. | | | | | | | | | | | | | | 21 | 40 | 100 |
| Indiana | Huntingdon C. i., w. i. | | | | | 18 | | | | | | | | 67 | 7 | 65 | 100 |
| Lancaster C. i., wi. 1 30 17,975 70.2 70.0 70.0 112 17 27 70.0 | Indiana | 1/2 | 12 . 2 | ,000 | | | | | | | | | | | | | |
| Melia C. | Lancaster C. i. | 4 | | | | | | | | | | | | | | | |
| Meyersdale C. 4 8 8 8 0.4 32 20 40 70 110 | McDonaldC. i., w. i. | | | | | | | 0.6 | | | | 2 | | | | | |
| North East C. 1. 4 8 800 112 1.704.7 1.704 2.81 16,566 4 90 4 2 85 100 Philadelphia C. 1 6 60 182,116 1,517 1,704.7 1.4 2.81 16,566 3 2.066 3 1 20 140 Sheanadosh C. 1 4 12 2.00 2.00 2.5 10 2,706 3 1.5 60 80 Sheanadosh C. 1 4 12 2.00 2.00 2.5 10 2,700 2.7 4 40 8 8 10 130 Sheanadosh C. 1 4 12 2.00 2.00 2.5 10 2,700 2.7 4 40 8 8 10 130 Sheanadosh C. 1 4 12 2.00 2.00 2.5 10 2,700 2.7 4 40 8 8 10 130 Sheanadosh C. 1 4 12 2.00 2.00 2.5 10 2,700 2.7 4 40 8 8 10 130 Sheanadosh C. 1 4 12 2.00 1.5 10 130 170 170 170 170 170 170 170 170 170 17 | Media | | | ,700 | | | 50.00 | | | 2 | | | | 5 | | | |
| Philadelphia C. i | Meyersdale | - | | | * * * * * | | | | | | | | | * ; | | | |
| Reading C. i | North EastC. 1. | | | | | | | | | | | _ | | 4 | | | |
| Shearadoan C. i. | Panding Ci | | | | | | | | | | | | | | | | |
| Susquehanna 2 19 | | | 40 | | | | | | | | | | - | | 15 | | |
| Robot Island: Westerly | Susquehanna | | | | | | | | | | | | | | | | |
| Westerly | | ~ | | | | | | | 2.0 | | | | | | | - 40 | |
| Woonsocket C. i. 4 20 13,418 5,678 58,68 2,97 0,08 170 19 677 67 687 16 50 120 South Carolina: Florence | | | 16 1 | 950 | | 97 92 | | 0.25 | | 9 | 101 | | 945 | | 02 | 40 | 09 |
| South Carolina Florence C. i. | Woonsocket C. i. | | | | | | | | | | | | | | | | |
| Florence | | - | 20 20 | ,110 | 0,010 | 00.00 | 2101 | 0.00 | 210 | 4.0 | 0 | 0. | 401 | | *** | 00 | |
| Orangeburg C, i | | 4 | 9 9 | 500 | | | | | | 9 | 190 | 6 | | | | 50 | 60 |
| South Dakota: Mitchell | Orangehurg C i | 4 | | | | 11.5 | | | | | | | | | | | |
| Mitchell C. i. 4 10 7,000 12 4,50 0.1 9 76 6 34 60 125 Yankton C. i., wd. 4 10 1,210 11 3 56 1 60 2 25 40 Terms: C. i. 4 36 50,927 3,850 233.5 67 1,450 161 2,624 200 45 75 Terms: C. i. 4 10 3,000 20 5 6 40 117 50 65 Houston C. i. 4 24 25,026 10 37 880 37 1,063 11 4 22 50 Largon C. i. 4 25,000 18.5 10 70 937 8 10 80 120 Lagon C | | 1 | | ,200 | 2 | 11.0 | | | | | 200 | | 00 | | | 40 | 220 |
| Yankton | | 4 | 10 7 | 000 | | 19 | 4.50 | 0.1 | | 0 | 76 | e | 24 | | | 60 | 195 |
| Tennessee: | Vankton Ci wd. | | | | | | | | | | | | | | 2 | | |
| Memphis C. i | | * | 10 1 | ,~10 | | 11 | | | | 9 | 30 | | .00 | | ~ | | - |
| Penton | | 4. | 26 50 | 097 | 9 950 | 922 5 | | | | 87 | 1.450 | 161 | 9 694 | | 200 | 45 | 75 |
| Denton | | 3 | 30 30 | ,500 | 3,000 | 200.0 | | | | . 01 | 1,400 | 101 | 2,024 | | 200 | 40 | |
| Houston | | | 10 0 | 000 | | 00 | | - | | | | | 40 | | 117 | 50 | 05 |
| Laredo | Denton | | | | | | | | | | | | | 11 | | | |
| Utah: C i 2 18 5,000 18.5 10 70 937 8 . 10 80 120 Sait Lake City C. i 4 36 47,000* 212 . 80 1,711 . | Laredo Ciwi | | | | | | | | | | | | | | | | |
| Logan C. i | | ~ | 10 1 | ,000 | 1,000 | 10 | | ~ | 0.0 | 9 | 110 | | 440 | 4.40 | 0 | 10 | 10 |
| Saft Lake City C. i. 4 86 47,000* 212 | | 9 | 19 5 | 000 | | 19.5 | 10 | | | 70 | 027 | 9 | | | 10 | 80 | 120 |
| Springville | | | | | | | | | | | | _ | | | | | |
| Vermont: Bellows Falls C. i. 4 20 11 0.3 0.25 3 71 2 92 7 13 100 160 Burlington | Springville Wd | | | | | | | | | | | | | | | | |
| Bellows Falls . C. i. 4 20 | | - | | ,000 | | | | | | | | | | | | | |
| Burlington W. i., c. i., 4 30 1,742 41.74 5.86 1 242 5 701 75 17 70 85 cmt. Ind. St. Albans C. i., cmt. Ind. 4 16 2,300 20 30.00 3,5 1* 92 100* 10 25 40 150 Virgina: Charlottesville C. i., w. i. 1 18 1,700 35* 2 2 7 9 2 93 37 91 35 75 Covington C. i. ½ 12 1,000 8* 2 6 100* 1,000* 10 400 50 24 60 180 Farmville C. i. 4 8 5,000 5.5 2 9 44 11 30 275 25 75 Washington: Hoquiam C. i., w. i. 6 18 20* 93 315 4,848 354 4,568 768 10 185 Spokane C. i., wd. 2 60 204,547 592.6 92.00 2 73 315 4,848 354 4,568 768 10 185 Spokane C. i., wd. 2 60 204,547 592.6 92.00 2 73 315 4,848 354 4,568 768 10 185 Spokane C. i., wd. 2 60 204,547 592.6 92.00 2 73 315 4,848 354 4,568 768 10 185 Spokane C. i., wd. 2 60 204,547 592.6 92.00 2 73 315 4,848 354 4,568 768 60 105 West Virginia: Sistersville C. i. 4 12 5 5 0.25 50 60 115 West Virginia C. i. 4 12 5 5 0.25 5 50 60 115 West Virginia C. i. 4 12 5 5 0.25 5 50 60 115 West Virginia C. i. 4 12 5 5 0.25 5 50 60 115 West Virginia C. i. 4 12 5 5 0.25 5 50 60 115 West Virginia C. i. 4 12 5 5 0 9.75 5 0 5 0 60 125 Berlin C. i. 4 12 5 500 9.75 5 3 84 1 5 5 5 10 180 C 1 18 | | A . | 90 | | | 11 | | 0.9 | 0.95 | 9 | 71 | 9 | 99 | 7 | 12 | 100 | 160 |
| St. Albans | Burlington W. i. c. i. | | | 742 | | | | | | | | | | | | | |
| St. Albans | emt. Ind. | | | , | | | | | 0,00 | • . | | | | | | | |
| Virgina: Charlottesville C. i., w. i. 1 18 1,700 35* 2 2 2 93 37 91 35 75 Covington C. i. ½ 12 1,000 8* 2 2 9 44 11 30 275 25 75 Washington: Hoquiam C. i., w. i. 6 18 20* 2 93 60 100 Seattle C. i., w. i. 6 18 20* 93 60 100 Seattle C. i., w. i. 2 6 92.00 2 73 315 4,848 354 4,568 768 10 135 Spokane C. i., w. i. 4 12 5 0.25 50 60 135 West Virginia: Sistersville C. i. 4 12 5 0.25 50 60 | | . 4 | 16 2, | 300 | | 20 | 30.00 | 3,5 | 1* | | 92 | | 100* | 10 | 25 | 40 | 150 |
| Charlottesville C. i., w. i. 1 18 1,700 35* 2 2 7 9 2 93 37 91 35 75 Covington Ci. 4/12 1,000 8* 2 6 100* 1,000* 10 400 50 24 60 180 Farmville Ci. 4 8 5,000 5.5 2 2 9 44 11 30 275 25 75 Washngton: Hoquiam C. i., w. i. 6 18 20* 93 60 100 Seattle C. i., wd. 2 60 204,547 592,6 92.00 73 315 4,848 354 4,568 768 2 10 135 Spokane C. i., wd., kal. 6 16 180,656 352.8 101 2,006 60 115 West Virginia: Sistersville C. i. 4 12 5 5 0,25 50 60 130 Wisconsin: Algoma C. i., w. i. 3/4 20 248 29.82 11.7 2,52 249 196 24 4 20 125 Berlin C. i. 4 12 500 9.75 3 84 1 40 100 Eau Clair C. i. 4 20 12,890 40 3 8 3 84 1 40 100 Eau Clair C. i. 4 20 12,890 40 8 95 50 65 Milwaukee C. i. 4 12 103,948 67 483.9 12.35 0,14 154 3,264 184 3,467 56 20 60 Neillsville C. i. 4 24 22,301 58.0 8 95 50 65 Milwaukee C. i., 4 16 1,897 20.2 1.00 0,15 2 177 5 148 57 85 Wausau C. i. 4 16 1,897 20.2 1.00 1 41 254 40 420 10 25 55 120 Wausau C. i. 4 16 8,000 1,120 37.3 21.00 1 41 254 40 420 10 25 55 120 | Virgina: | | | | | | | | | | | | | | | | 0 |
| Covington . C. i. 4 8 5,000 . 5.5 | | 1 | 18 1. | 700 | | 35* | 3 | 3 | 2 | 7 | 9 | 2 | 93 | 37 | 91 | 35 | |
| Mashington: Hoquiam | CovingtonC. i. | | | | | 8* | 3 | | 6 | 100* | 1,000* | 10 | 400 | | 24 | | |
| Washngton: Hoquiam C. i., w. i. 6 18 93 60 100 Seattle C. i., wd. 2 60 204,547 592.6 92.00 73 315 4,848 354 4,568 768 10 135 Spokane C. i., wd., kal. 6 16 180,656 352.8 101 2,006 60 115 West Virginia: Sistersville C. i. 4 12 5 0.25 50 60 60 115 Wisconsin: Algoma C. i. 4 10 4.66 3.25 38 30 1 40 110 Ashland C. i., w. i. 3/4 20 248 29.82 11.7 2.52 249 196 24 4 | FarmvilleC. i. | | 8 5, | 000 | | 5.5 | | 2 | 2 | 9 | 44 | 11 | 30 | 275 | | 25 | 75 |
| Hoquiam C. i., w.i. 6 18 20* | Washnaton: | | | | | | | | | 3 | | | | | | | |
| Seattle C. i., wd. 2 60 204,647 592.6 92.00 2 73 315 4,848 354 4,568 768 2 10 135 Spokane C. i., wd., kal. 6 16 180,656 352.8 101 2,006 60 115 West Virginia: Sistersville C. i. 4 12 5 0.25 50 60 130 Wisconsin: Algoma C. i., w. i. 34 20 248 29.82 11.7 2.52 38 30 1 40 110 Ashland C. i., w. i. 34 20 248 29.82 11.7 2.52 38 4. 1 40 110 Ashland C. i. 4 12 500 9.75 3 84 1 40 100 Eau Clair C. i. 4 12 500 9.75 3 84 1 40 100 Eau Clair C. i. 4 20 12,890 40 14 420 30 315 75 140 Fort Atkinson C. i. 3 12 25,000 8 8 95 56 65 Milwaukee C. i. 4 12 108,948 67 483.9 12.35 0.14 154 3,264 184 3,467 56 20 60 Neillsville C. i. 4 42 7 32,00 2 0.08 1 21 90 107 Sipperior C. i. 4 24 22,301 58.0 11 103 47 9 35 120 Superior C. i. 4 16 1,897 20.2 1.00 0.15 2 177 5 148 5 75 85 Wausau C. i. 4 16 1,897 20.2 1.00 0.15 2 177 5 148 5 75 85 Wausau C. i. 4 16 8,000 1,120 37.3 21.00 1 3 14 254 40 420 10 22 55 120 | Hoquiam C. i., w. i. | | | | | 20* | | | | | 98 | | | | | | |
| Spokane C.i., wd., kal. 6 16 180,656 352.8 101 2,006 60 115 West Virginia: Sistersville C. i. 4 12 5 0.25 50 60 130 Wisconsin: Algoma C. i. 4 10 4.66 3.25 38 30 1 40 110 Ashland C. i. 4 12 500 9.75 38 30 1 40 110 Earlin C. i. 4 12 500 9.75 38 30 1 40 110 Earlin C. i. 4 12 500 9.75 38 38 1 14 10 40 125 Berlin C. i. 4 12 500 9.75 38 38 1 40 100 Eau Clair C. i. 4 20 12,890 40 14 420 30 | Seattle | | 50 204, | 547 | | 592.6 | | 2 | | | 4,848 | 354 | 4,568 | 768 | 2 | | |
| Sistersville . C. i. 4 12 | SpokaneC.i,,wd.,kal. | 6 | 16 180, | 656 | | 352.8 | | | | 101 | 2,006 | | | | i . | 60 | 115 |
| Sistersville . C. i. 4 12 | West Virginia: | | | | | | | | | | | | | | | | |
| Algoma . C. i. 4 10 | SistersvilleC. i. | 4 1 | 12 . | | | 5 | | | 0.25 | | 50 | | 60 | | 4.4 | 130 | |
| Ashland C. i., w. i. 34 20 248 29.82 11.7 25.52 349 106 24 4 20 125 Berlin C. i. 4 12 500 9.75 3 84 1 40 100 Eau Clair C. i. 4 20 12,890 40 14 420 30 315 75 140 Fort Atkinson C. i. 3 12 25,000 8 8 95 50 65 Milwaukee C. i. 4 12 103,948 67 483.9 12.35 0.14 154 3,264 184 3,467 56 20 60 Milwille C. i. 4 42 7 32.00 2 0.08 1 21 90 107 Ripan C. i., gal. 1 12 11.4 0.73 1 103 47 9 35 120 Superior C. i. 4 24 22,301 58.0 41 742 50 135 Watertown C. i. 4 16 1,897 20.2 1.00 0.15 2 177 5 148 5 75 85 Wausau C. i. 4 16 8,000 1,120 37.3 21.00 1 3 14 254 40 420 10 2 55 120 | Wisconsin: | | | | | | | | | | | | | | | | |
| Ashland C. i., w. i. 34 20 248 29.82 11.7 2.52 349 196 24 4 20 125 Eerlin Ci 4 12 500 9.75 3 84 1 40 100 Eau Clair Ci 4 20 12,890 40 14 420 30 315 75 140 Fort Atkinson 5. 3 12 25,000 8 8 95 50 65 Milwaukee Ci 4 12 108,948 67 483.9 12.35 0.14 154 3,264 184 3,467 56 20 60 Neillsville 14 42 7 32,00 2 0.08 1 21 90 107 Ripan C. i., gal, 1 12 11.4 0.73 1 103 47 9 35 120 Superior Ci 4 24 22,301 58.0 41 742 60 135 Watertown Ci 4 16 1,897 20.2 1.00 0.15 2 177 5 148 5 75 85 Wausau Ci 4 16 8,000 1,120 37.3 21.00 1 3 14 254 40 420 10 2 55 120 | Algoma | | | | | 4.66 | 3.25 | | | | | | | | | | |
| Eau Clair C. i. 4 20 12,890 40 14 420 30 315 75 140 Fort Atkinson C. i. 3 12 25,000 8 8 95 50 65 Milwaukee C. i. 4 12 103,948 67 483.9 12.35 0.14 154 3,264 184 3,467 56 20 60 Neillsville C. i. 4 42 7 32.00 2 0.08 1 21 90 107 Ripan C. i.,gal. 1 12 11.4 0.73 1 103 47 9 35 120 Superior C. i. 4 24 22,301 58.0 41 742 50 135 Watertown C. i. 4 16 8,000 1,120 37.3 21.00 1 3 14 254 40 420 10 2 55 120 Watertown C. i. 4 | Ashland | | | | | | 11.7 | | 2,52 | | | | 196 | 24 | 4 | | |
| Fort Atkinson C. i. 3 12 25,000 8 12.35 0.14 8 95 50 65 Milwaukee C. i. 4 12 103,948 67 483.9 12.35 0.14 154 3,264 184 3,467 56 20 60 Neillsville C. i. 4 42 7 32.00 2 0.08 1 21 90 107 Ripan C. i., gal. 1 12 11.4 0.73 1 103 47 9 35 120 Superior C. i. 4 24 22,301 58.0 41 742 50 135 Watertown C. i. 4 16 1,897 20.2 1.00 0.15 2 177 5 148 5 75 85 Wausau C. i. 4 16 8,000 1,120 37.3 21.00 1 3 14 254 40 420 10 2 55 120 Wausau C. i. 4 16 8,000 1,120 37.3 21.00 1 | Berlin | | | | | | | | | | | | | | | | |
| Milwaukee C. i. 4 12 103,948 67 483.9 12.35 0.14 154 3,264 184 3,467 56 20 60 Neillsville C. i. 4 42 7 32.00 2 0.08 1 21 90 107 Ripan C. i.,gal, 1 12 11.4 0.73 1 103 47 9 .35 120 Superior C. i. 4 24 22,301 58.0 41 742 50 135 Watertown C. i. 4 16 1,897 20.2 1.00 0.15 2 177 5 148 5 75 85 Wausau C. i. 4 16 8,000 1,120 37.3 21.00 1 3 14 254 40 420 10 2 55 120 | Eau Clair | | 10 12, | 890 | | | | | | | | | | | | | |
| Neillsville C. i. 4 42 7 32.00 2 0.08 1 21 90 107 Ripan C. i., gal. 1 12 11.4 0.73 1 103 47 9 35 120 Superior C. i. 4 24 22,301 41 742 50 135 Watertown C. i. 4 16 1,897 20.2 1.00 0.15 2 177 5 148 5 75 85 Wausau C. i. 4 16 8,000 1,120 37.3 21.00 1 3 14 254 40 420 10 2 55 120 | | | 12 25, | 000 | | | | | | | | | | | 5.0 | | |
| Ripan | Nailleville | | 0 | | | | | | | | | | | | | | |
| Superior C. i. 4 24 22,301 58.0 41 742 50 135 Watertown C. i. 4 16 1,897 20.2 1.00 0.15 2 177 5 148 5 75 85 Wausau C. i. 4 16 8,000 1,120 37.3 21.00 1 3 14 254 40 420 10 2 55 120 Wausau | | | | | | | | _ | | | | | | 9 | | | |
| Watertown | Superior | | | | | | | | | | | | | | | | |
| WausauCi. 4 16 8,000 1,120 37.3 21.00 1 3 14 254 40 420 10 2 55 120 | | | | | | | | | | | | | | | | | |
| W | Wausau | 4 1 | 16 8, | | | | | | | _ | | 40 | 420 | . 10 | 2 | 55 | 120 |
| | WauwatosaC. i. | 6 1 | | | - | | | | | | | 21 | 104 | * * | 16 | 70 | 90 |

*Approximate. 11 to 3-inch galvanized. 3 Not known. 3 Too small to record. 415 miles of this laid on surface for summer use. 6 On 30 miles of wood; none on iron. 6 Includes gates and paving. 7 Includes repairs on service pipes. 6 About 60% of this acquired by annexation. 9 Included under stop gates. Norz.—C. i. means cast iron; w.i., wrought iron; gal., galvanized iron; wd., wood; cmt. Ind., cement lined; univ., universal cast iron; lk. bar., lock bar; ld., lead; st., steel; kal., kalamine.

ADDITIONAL STATISTICS OF WATER WORKS OF THE UNITED STATES TABLE NO. 1.—GENERAL INFORMATION

| | | | TABLE NO. I.—GEN | TICAL TIME | TOTALIOIA | | | |
|------------------------------|--|-----------------------------|---|------------------------|-----------------------------|---------|----------|--------------------|
| Name of city. Arkansas: | Date of con- struction. 1882. | Private or municipal. | Source of supply. | Gravity or pumping. | Method of treatment. | Total. | · lines. | Sup. with water |
| | 100%. | Private. | River | Pumped to res. | Coagulation and filtration. | 60,000 | 50,000 | 45,000 |
| Colorado: Silverton Georgia: | 1882. | Municipal. | Mountain streams | Gravity. | None | 2,500 | 2,500 | 2,500 |
| Albany | | Municipal, | Artesian wells | Air pumping. | None | 10,000 | 10,000 | 10,000 |
| Atlanta | 1892. | Municipal. | River | Pumping. | Filtration | 160,335 | | |
| Covington | | Municipal. | Creek, | Pmpd. to stndp. | Filtration | 3,000 | 2,500 | 1,500 |
| Ilinois: | | municipal. | Orces, IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII | imparto strap. | Z milation | 0,000 | -, | -,, |
| Canton | 1880. | Municipal. | Wells | Pumping. | | 10,500 | | |
| Rockford | 1875. | Municipal. | Deep well | Pumping. | None | 50,000 | 30,000 | 30,000 |
| Kansas: | 2010. | municipal. | Deep wen | r umping. | atome | ooyooo | 00,000 | |
| Caldwell | | Municipal. | Creek and well | Pumping. | None | 2,500 | 2,000 | 1,500 |
| Minnesota: | | an amerpan | Citch and West total the city | r amping. | trone | ., | - , | -, |
| Lake City | 1893. | Municipal, | Driven wells | Pumping. | None | 3,500 | 2,000 | 1,000 |
| Mississippi: | 2000. | and district parts | 2011011 110110 111111111111111111111111 | a margarity | | -, | , | |
| Jackson | 1888. | Private. | River | Pumping. | None | 25,000 | 22,000 | 22,000 |
| Missouri: | 2000. | 2 1114461 | | - m.pg. | | , | , | |
| Farmington | 1903. | Municipal. | Deep wells | Gravity. | | 3,000 | 1,000 | |
| New Jersey: | 2000 | | moop nong trittering | aray. | ••••• | -, | ., | |
| Rahway | 1871. | Municipal, | River | Pumping. | Pressure filter | 10,000 | 8,000 | 8,000 |
| New York: | 20.2. | | | bg. | | , | -, | |
| Niagara Falls | 1911. | Municipal. | River | Pumping. | Rapid sand filter | 35,000 | | |
| Ossining | 1889. | Municipal. | Brook. | Pumping. | None | 11,000 | 9,000 | |
| Potsdam | 1871. | Municipal. | River | Pumping. | Filtration | 4,500 | 4,400 | 4,400 |
| Texas: | 20111 | | | | | | | |
| Clarksville | 1905. | Municipal. | Deep wells | Air pumping. | None | 3,000 | | |
| Denton | 1891. | Municipal. | Artesian well | Air pumping. | Filtration | 8,000 | 5,000 | 6,000 |
| Lufkin | 1898. | Municipal. | Impounding reservoir | Pumping. | None | 5,500 | 1,500 | 1,000 |
| Mineral Wells | 1904. | Municipal. | Lake | Pumping. | Clarifying | 6,000 | 4,500 | 2,500 |

For footnotes, see page 16.

ADDITIONAL STATISTICS OF WATER WORKS OF THE UNITED STATES.

Table No. 2.—Consumption and Cost

| 631,025 | meters, metered. | 4,600,000 | Gallons | Consumption———————————————————————————————————— | Per tap. | Total maintenance. | Maintenance + interest on value of property. |
|---|---|--------------------|---|--|-----------|--|--|
| ne year. through r ,000,000 416,00 ,000,000 ,631,025 | meters, metered. | 4,600,000 | per inhabitant. | per consumer. | | maintenance. | |
| ,000,000 416,00 ,000,000 ,681,025 | 00,000 | 4,600,000 | | | | | value of property. |
| ,000,000 ,631,025 | , | 4,600,000 | | | | | |
| 631,025 | | | | | | | |
| 631,025 | | | | | | 4 | minima. |
| 631,025 | | 1,250,000 | 125 | | | | |
| | | 14,914,059 | 95 | | | | 53.27 |
| | 0,000 100 | 80,000 | | * * * * * | **** | \$30.00 | |
| 31,30 | 0,000 | 00,000 | | **** | **** | \$30.00 | |
| 000 000 | 0.000 -00 | 010 100 | | | | | |
| | 0,000 100 | 219,178 | ***** | ***** | * * * * * | **** | |
| 076,820 981,05 | 7,615 75 | 3,583,772 | 71.67 | 119.5 | 434.9 | 18.834 | |
| | | | | | | | |
| | 100 | 257,332 | 1001 | 170¹ | 800 | 50.00 | 55.00 |
| | | , | | | | | |
| 000,000 48.00 | 0.000 100 | | | | | | |
| , | -, | | | | | | |
| 250 000 | | 2 950 000 | 130 | ~ | 219 | | 10.86 |
| ,200,000 | | 5,250,000 | 100 | | 01. | * * * * * * | 10.00 |
| 000 0001 | 1002 | 05.000 | | | | | |
| 000,000 | 100- | 35,000 | | | * * * * * | * * * * * | ***** |
| 000 001 100 00 | | | | | | | |
| 909,034 400,00 | 0,000 6633 | 1,884,365 | 188 | 235 | 115 | | |
| | | | | | | | |
| | 75 | 700,000 | | | | | |
| 000,000 | | 800.000 | 178.8 | 181.8 | 197.5 | 14.92 | |
| | | , | | | | | ***** |
| | 30 | | | | | | |
| | 20 | | | | | | ***** |
| 000 000 | | | | | | | |
| | 00,000 75 | 110,000 200,000 | 33 | 80 | 300 | $9.00 \\ 127.30$ | 146.10 |
| - | 250,000 000,000¹ 909,034 400,00 | 250,000 | 250,000 3,250,000 000,000¹ 100² 35,000 909,034 400,000,000 66¾ 1,884,365 75 700,000 800,000 30 | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | 250,000 | $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | 250,000 3,250,000 130 812 000,000¹ 100² 35,000 909,034 400,000,000 66⅔ 1,884,365 188 235 115 75 700,000 ,000,000 800,000 178.8 181.8 197.5 14.92 |

Table No. 3.—Distribution System

| | | Size | -During | y vear- | Total | Cost, | | Length | No. hyd | lrants | No. | stop ga | tes | No. | | ress- |
|-----------------|---------------|----------------------|----------------|---------|--------------------------|---------|------------------------------|--|--------------------------|-------------|--------------------------|-------------------|---------------------------|-------------|------|-------|
| Name of city. | Kind of pipe | of pipe, ins. To. | Ex- tended, | Discon- | now in use, miles. | repairs | No. of leaks per mile. | of pipe less than 4" diam. mls, | Added during year. | Now in use. | Added during year. | Now in use. | Smaller than 4-111. | of blow- | on i | mains |
| Arkansas: | | | | | | | | | | | | | | | | |
| Little RockC | .i.,gal.,w.i. | 2 16 | | | 107 | | | 16 | | 480 | | | | | 40 | 105 |
| Georgia: | | | | | | | | | | | | | | - | | |
| Albany | | 4 12 | 2,000 | | | | | | 8 | 128 | | 1 *** * | | 8 | 30 | |
| AtlantaC | | 4 60 | 251,437 | 46,090 | 282.08 | | | | 469 | 2,690 | 687 | 3,388 | | | 40 | |
| Covington | . 1. | 6 12 | 500 | | | | | | | 120 | | | | | 30 | 70 |
| Illinois: | | | | | | | | | | | | | | | | |
| Canton | , 1. | 4 6 | 2,099.7 | | 21.14 | | | | 4 | 300 | 6 | | | | 90 | 120 |
| Kansas: | | | | | | | | | | | | | | | | |
| Caldwell | . i. | 4 12 | | | 15* | | | 1 | | 91 | | 15 | | | 40 | 60 |
| Minnesota: | | | | | | | | | | | | | | | | |
| Lake City | , i. | 4 12 | 3,000 | | | | | | 7 | 59 | | | | | 60 | |
| Mississippi: | | | | | | | | | | | | | | | | |
| Jackson | , i, | 4 20 | 13,000 | | 54 | 3.50 | 4 | 4 | 14 | 540 | 32 | | . 12 | 18 | 45 | 60 |
| New Jersey: | | | | | | | | | | | | | | | | |
| Rahway | mt., c. i. | 2 12 | 939 | | 20.5 | 33,87 | | .72 | 2 | 193 | | | | | 45 | 48 |
| New York: | | | | | | | | | | | | | | | | |
| Niagara Falls C | . i. | 4 36 | | | | | | | | 800 | | | | | 110 | |
| Ossining | , i. | 4 16 | 4,000 | | 18* | | | | 6 | 179 | | | | | 15 | 140 |
| Potsdam | i.,wd.,cm | t.2 10 | 6,480 | | 18 | 11.77 | .9 | .25 | 6 | 98 | 26 | 130 | 2 | .3 | 60 | 100 |
| Texas: | | | -, | | | | | | | | | | | | | |
| Clarksville | . i. | 4 8 | 9.000 | | 5 | 3.00 | | . 2 | | 30 | | 12 | 4 | 1 | 45 | 52 |
| Lufkin | . i. | 4 6 | | | 5 | | ***** | 14.00 | | 200 | | | | | 20 | |
| Mineral Wells C | . i. | 6 6 | | | 4.5 | 8.00 | 4 | | 42 | 720 | | 34 | | | 80 | 85 |
| *Approximate. | | | | | | * | | | | | | | | | | |

Table No. 4.—Services and Meters

| Alabama Alab | Motors and ipts elevators No. of No. |
|--|---|
| Troy W. i. ½ 1 | ii addedi usei water g |
| Helena | |
| Little Rock Gal, Id. 34 | |
| Rogers Gal. 34 1 26 840 32 50 16.8 30 California: Pomona St.¹ 4 16 100 175 2,800 500 1,100 40 500 30 Stockton W. i. 34 2 600 5,368 30 500 30 500 30 30 30 500 30 | 2 |
| California: Pomona St.¹ 4 16 100 175 2,800 500 1,100 40 500 1,100 40 500 1,500 20 500 1,000 3 3 3 1,500 20 500 1,500 20 500 1,500 20 < | |
| Pomona St.1 4 16 | 3 |
| Stockton W. i. 34 2 1,000 1,000 600 5,368 30 500 3 Watsonville W. i. 34 2 1,000 1,000 1,500 20 Colorado: Colorado Springs. 197 11,660 20 191 1.6 20 Greeley Ld. 34 28 89 Las Animas Ld. & gal. 34 Silverton Victor <td></td> | |
| Watsonville | |
| Colorado: 197 11,660 | |
| Colorado Springs. | |
| Greeley Ld. \$6 34 28 89 Las Animas Ld. & gal. 34 410 40 7.50 Silverton 2 7 Victor 8 28 | |
| Las Animas . Ld. & gal. 34 | 7 |
| SilvertonGal. 34 | |
| Victor Gal. 1/4 4 65 8 28 | |
| | |
| | 8 |
| Connecticut: | |
| Meriden Gal., c. i. 34 6 50 486 11 | |
| Middletown W. i. ² 34 2 961 9 53 2,360 20 4 91 4 23 Naugatuck Gal. 34 2 46 1,450 74 | 7 |
| Naugatuck Gal. 34 2 46 1,450 74 New Britain W.i. 34 8 134 4,587 1,868 3,130 70 33 | |
| New Britain W. i. 34 8 134 4,587 1,868 3,130 70 33 New London Ld. & gal, 34 8 1,376 356 15,3 62 4,186 19.3 11.33 99 802 19 46 | |
| New London Ld. & gal, 1/4 8 1,376 356 15,3 62 4,186 19.3 11.33 99 802 19 46 Norwich Ld. & gal, 1/4 2 | |
| South Norwalk | |
| Wineted I d 7/ 11/ 150 10 100 10 96 1198 | 10 0 |
| | 10 |
| Delaware: Dover | 3 9 |
| | |
| Wilmington I d m: 1/ 6 10 607 40 400 10 71 71 00 570 6 000 96 6 50 | s |
| | .0 |
| Florida: | - 1/ |
| Daytona Gal. 34 11/4 2,803 1.5 88 252 31.8 7.00 88 254 100 100 | |
| PensacolaGal. 34 2 4,000 18 150 5,200 30 88 2,300 88 98 | 6 |

TABLE No. 4.—STATISTICS OF WATER WORKS OF THE UNITED STATES SERVICE AND METERS—Continued

| | | | | Discon- | m-4-1 | N. | | | | Met | ers | | cent. | | rs and | No of | |
|--|--|-------|---------------|------------------------|-------------------|---------------------------------|-----------------------|-------------------------|-----------------------|------------------------|---------------------------|---|--------------------------------------|---------|---------|---|--|
| Name of city. Kind | of p in From | ipe, | year. | during year, ft. | now | No. added during year. | No. now in use. | Aver- age length. | Aver- age cost. | No. | No. now in use. | ices me- | Receipts from metred water. | | No. | No. of stndpipe for st, water'g. | |
| Georgia: Albany | - 1 | . 10. | ft. | | mics. | 100 | 1,500 | | , | added | | | water. | audeu. | use. | 10 | |
| AthensW. i. AtlantaW. i. | 3/4 3/4 | 4 3 | | | | 107 2,542 | 1,205 23,381 | | | 107 2,542 | 1,305 23,381 | 100 | | | 5 | | |
| CedartownGal, CovingtonGal. | 1/2 3/4 | 1 | | | | 40 | 600 225 | . 14 | | 10 20 | 100 225 | 10 100 | | • • | | | |
| Fort Valley Gal. | 1/2 3/4 3/4 1/2 1/2 | 2 | 8,000 | | | 20 62 | 703 | 100 35 | | 20 80 | 225 220 | 75 33 | | 15 | | 1 2 | |
| Moultrie Gal. Sandersville Gal., w. i. | 1/2 | 1 | | | | 10 | 200 290 | 15 40 | 1.00 78.00 | .10 | 200 210 | 100 | 100 | | | i | |
| Tifton | 3/4 3/4 | 3 | 5,000 $2,400$ | | 4 | 28 | 260 | 150 | 18.00 | 30 | 190 | 85 | 75 92 | | 2 | i | |
| Idaho: | | | | | | 25 | 1,000 | | | 25 | 1,000 | 100 | | | 3 | 1 | |
| Moscow | • • | | ***** | | | | 2,000 | | | 20 | 2,000 | | | | | | |
| AuroraLd, BeardstownGal. | 5/8 3/4 | 2 | | | | * * * * * | 9004 | | | 329 | 5,402 | 100 | | • • | 3 | - 1 | |
| BellevilleW. i., ld. BushnellW. i., ld. | 3/4 3/2 | 2 | 750 | | 5 | 50 15 | 2,330 300 | 25 40 | 5.00 | 750 12 | 2,000 138 | 50 | 50 | | 1 | i | |
| CantonLd. | 5/8 | | | | | 223 | | 40 | 10.00 | 230 | | | | | | | |
| Champ'gn-Urbana.Gal. ChicagoLd. | 3/4 | | ***** | | ** | 10,185 | 3,899 | | | | 3,258 | 84 | **** | | | | |
| ElginLd. HinsdaleLd. | 3/4 3/4 | 6 | 6,000 | 7 | 22.8 | 230 25 | 4,840 750 | 50 | | 506 25 | 3,601 750 | 90 100 | 100 | | • • | 2.0 | |
| KewaneeLd., gal. Lake Forest | 3/4 | 2 | 200 | | * * | 30 | 900 671 | 60 | 35.00 | 32 34 | 977 671 | $\begin{array}{c} 100 \\ 100 \end{array}$ | 98 95 | • • • | | . 1 | |
| MarshallGal. MascoutahLd. | 134 | 11/2 | | | • • | | | | | | 6 | | | | | 1 | |
| MetropolisGal. MolineW.i., ld. | 1/4 5/8 | 1 | | | | 504 | 350 | 60 | | 5 | 55 | 12.5 | **** | * * * | | 1 | |
| MorrisW. i., ld. Oak ParkLd. | 3/4 | 2 | 17,102 | 150 | | 1,013 | 842 | 75 | | 324 | 842 | 100 | 100 | ** | | | |
| Olney | 1. 5/8 | 6 | | | | 25 704 | 375 11,664 | 20 | | 274 | | 100 | | | 13 | ** | |
| OuincyLd., w. i., c. | i. ½ | 6 | 7 776 | 200 | 95 | 269 | 5,451 | | 18 00 | 249 | 3,281 | 60 | 72 | i | 3 | 9 | |
| RockfordLd., w. i. Rock IslandLd. | 5/8 | 10 | 7,776 | 300 | | 486 | 5,000 | | 16.00 | 1,494 175 | 5,317 8504 | | **** | | 6 | 18 | |
| St. CharlesLd., c. i. StreatorLd., gal. | 9/8 1/2 | 2 | 2,000 600 | | 1.1 | 50 121 | 423 3,671 | 40 | 25.05 | 52 41 | 423 | 100 13 | 98.06 | | ** | . / 2 | |
| Indiana: | =/ | | | | | 05 | W15 | 00 | | | | | | | | - 1. | |
| AuburnLd. BrookvilleW. i., ld. | 3/4 3/4 | | | | | 65 | 715 | 20 | | | 4 | **** | | | | 2 | |
| ClintonGal. East ChicagoLd. | 3/4 3/4 | 2 2 | | | | 170 | 790 2,512 | 18 | | 10 | 45 38 | 5 1.1 | * *** | | | 1 | |
| ElkhartLd. GarrettGal., ld. | 3/4 3/4 | 2 2 | | | | 221 | 5,007 800 | 45 85 | | 1,000 | 2,070 | 60 | * * * * * | 10 | 5 10 | i | |
| Gas CityGal. GreenfieldGal. | 3/4 3/4 | 2 | 400 200 | | $\frac{3.5^4}{2}$ | | 600 | 100 30 | 0.50 | 1 36 | 350 | | | | | 5 | |
| JeffersonvilleGal. LintonW. i., gal. | 3/4 3/4 3/4 3/4 1/2 3/4 | 2 3/4 | 2,000 | | | 173 | 1,054 1,200 | 40 | 10.50 8.00 | 41 | 50 67 | 5 5.5 | | | | ï | |
| Madison Gal., w. i. | 3/4 | 3 | • • • • • | | 7 | 21 | | | 5.00 | | | | * *** | | | 3 | |
| North Manchester RichmondGal., ld. | 58 | | | | | 194 | 500 4,652 | 19 | 14.00 | 30 240 | 500 ⁴ 2,826 | 60 | * * * * * | | 6 | 2 | |
| RockportGal. | 5/8 3/4 1/2 | 1 | 6004 | | | 26 25 | 400 350 | 30 | | | 100 | 25 | 25 | | 204 | 2 | |
| RushvilleW. i. ShelbyvilleGal. | 1/2 3/4 | 234 | | 100 | | 108 | 1,300 1,266 | | | 16 | 54 | 5 | | | | | |
| Terre HauteLd., gal. | 5/8 3/4 | 134 | | | | 337 | 5,845 934 | | | 77 200 | 2,025 522 | 34.6 | | | 17 | 4 2 | |
| ValparaisoLd. VincennesGal, | 98 34 1/2 1/2 | 1 2 | | | | 58 | 1,350 | | 12.00 | 75 | 650 | | 67 | | | . 3 | |
| Iowa: | /- | | | , | | | | | | , | ***** | | | ** | | | |
| AlbiaLd., gal. | 3/4 3/4 | | | | 5 | 10 | 1,000 | 30 | | 10 | 255 100 | 10 | * * * * * | * * * * | | | |
| BooneLd. BurlingtonGal., ld. | 3/4 3/4 | 2 2 | | | | 60 319 | 1,000 3,973 | 4 60 | | 60 | 9004 200 | | 85 32 | | •• | 3 | |
| CarrollGal. Cedar FallsLd., gal. | 3/4 1/2 3/4 | 1 | | | | 110 | | 121/2 | | 90 | 20 630 | 55 | 75 | | | | |
| Dubuque | | | • • • • • | • • • • • | | 285 20 | 3,325 500 | | | 339 | 3,464 403 | 95 75 | 90 | | • • | 16 | |
| FairfieldGal., ld. | 1/2 | 11/4 | | | | 21 | 382 | | | 26 | 3004 | 65 | 75 | | | 1 | |
| MuscatineLd., gal. ShenandoahGal., ld. | 1/2 3/4 5/8 | 1 | 500 | | ** | 180 | 2,500 42 | 25 | 12.50 | 50 31 | 150 720 | 90 | 90 | * * * | • • | 3 | |
| VintonLd., gal. | 3/4 | i | | | | 60 | 280 | | | 2 | 12 | 5 | 25 | | 1 | 1 | |
| Kansas: CaldwellGal. | 3/4 | | 9,750 | | 104 | 65 | 320 | | | 65 | 320 | 100 | 100 | | | 1 | |
| Clay CenterGal., c. i. | 3/4 | 4 | 5,915 | | | 30 | 610 1,895 | 4 50 | 6.00 | 25 ⁴ 406 | | | 70 . | | 4 | 2 | |
| Hiawatha | | | | | • • | 25 | 525 | | | 50 | 500 | 90 | | * * * * | | 30 | |
| HortonGal. | 3/4 1/2 5/8 | i | | • • • • • | | 100 | 320 150 | | | 100 | 300 | 98 | 100 | | | 1 | |
| Ottawa | 58 | 3⁄4 | • • • • • | * * * * * | | | | 90 - | | ****** | 300 | | **** | | | 3 | |
| DanvilleLd., w. i. ⁵ GlasgowGal, | 5/8 | 1 | 9004 | | | 56 75 | 678 | 206 | 11.00 | 75 | 678 | 100 | 100 | | 1 | | |
| LexingtonLd., c. i. | 5/8 5/8 5/8 3/4 | 6 | | • • • • • | | 616 1,908 | 5,117 | 19 | 11.00 | 554 | 4,859 | 100 | | *** | 6 | 10 | |
| LouisvilleLd., c. i. ParisGal. | 3/4 | 2 | 1,500 | | | 46 | 36,992 1,000 | | 11.89 | 216 1 | 2,800 40 | 7.8 | | | 6 | 205 | |
| Maine: BangorGal. | 1 | 2 | 2,000 | | | 122 | 5,012 | 15 | | 8 | 75 | 1 | **** | | 20 | 36 | |
| BiddefordGal. BrewerGal. | | 1 | 7,451 | | * * | 147 | 3,669 1,200 | | | 55 | 322 | 8.7 | | | | 21. | |
| Calais | 34 34 34 34 | | | | | | | | | 2 | 47 | | | | | | |
| Gardiner W. i., gal. | 3/4 3/4 3/4 | 2 | 4,000 | ***** | 8 | 26 | 1,492 | | | | | • • • • | **** | | | 3 | |
| HollowellGal. LewistonGal., ld., lnd | . 1 | :: | | | * | 25 50 | 635 2,850 | 10 | 10.00 | 20 | 250 | • • • • | * *** | | 14 | 7 | |
| PittsfieldGal. SkowheganGal. | 3/4 1/2 | 3/4 | • • • • • | | | 5 | 559 650 | | 10.00 | 10 | 285 | 30 | **** | 4 | | 3 | |
| Maryland: BaltimoreLd, Ind. | | 2 | | | | 2,774 | | 24 | | 86 | 3,300 | . 8 | - 36 - | | | | |
| EastonGal. | 1/2 | 11/2 | | | | 2,114 | 586 | | | | 3,300 | | | | 4 | | |
| For footnotes, see page 16. | | | | | | * | | | | | | | - 4 | | | A | |
| | | | | | | | | | | | | | 1 1 | | | | |

TABLE No. 4.—STATISTICS OF WATER WORKS OF THE UNITED STATES SERVICE AND METERS—Continued

| | | | | Discon- | .,,,,, | Lito | Contin | · · · · · · · · · · · · · · · · · · · | | Me | ters | -Per | cent. | Moto | rs and | |
|---|-------------------|-------|------------------------|------------|----------------------|--------------|-----------------------------|---------------------------------------|----------------|--------------|-----------------------|--------------|--------------|---------------|-------------|---------------------|
| | | ipe, | Extended during | tinued | Total now | No. added | No. | Aver- | Aver- | | No. | Serv- 1 | Receipts | -elev | ators | No. of stndpipe |
| Name of city. Kind of pipe. | in | . To. | year. ft. | | in use miles. | during year. | now in use. | age length. | age | No added. | now in | | metred | No. added. | uow in use. | for st. water'g. |
| Massachusetts: BostonLd., ld. lnd., | | 12 | 89,250 | 9,034 | 553.3 | 3,758 | 100,914 | 29 | 18.007 | | 27,041 | 26.8 | | | | 542 |
| cmt.lnd.,c.i. | | | | | | | | | | | _ | | 60.9 | •• | | |
| Brockton Cmt. Ind., ld., lnd., c.i. | 3/4 | 8 | 6,166 | 981 | 58.3 | 247 | 8,426 | 55.5 | 21.10 | 283 | 8,407 | 99.7 | 99.4 | • • | 13 | • • |
| Brookline W.i.,cmt.lnd. Cambridge Gal., c. i., ld. | 34 | 8 | 6,870 | | 4,943 | 169 184 | 15,676 | 37 | 20.92 | 432 | 4,684 | 100 29 | | • • • | | • • • |
| Clinton W.i.,cmt.lnd. | | 2 | . 890 | | 8.1 | 28 | 1,834 | 23 | 14.77 | 31 | 1,590 | 87 | 76.56 | | 23 | 12 |
| ConcordLd., gal., w.i., cmt. Ind. | 5% | 3/4 | 3,950 | | | . 47 | 1,176 | • • | • • • • • | 2 | 28 | • • • • | | | | 2 |
| Danvers | 1 | 2 | 6,855 | | 24.5 | 101 | 2,185 | 59 | 21.50 | 084 | 40 | | | | • • | 13 |
| EverettLd., ld. lnd. FitchburgW.i.,cmt.lnd. | 5/8 3/4 | 10 | | | | 159 177 | 5,539 5,339 | * * * * * | 4.66 | 374 376 | 1,560 4,001 | * * * * * | | i | 121 | 62 |
| FraminghamLd.,w.i.,gal.,c.i GardnerGal.,w.i.,cmt. | | 8 | $\frac{10,049}{2,995}$ | | 18.4 | 163 63 | 1,899 $1,795$ | 47.5 | 13.70 | 143 | 1,876 120 | 100 6 | 97 18 | | i | 11 |
| lnd. | _ | | | | | | | | | | | | | | | |
| Gloucester Cmt, Ind., gal. Haverhill Ld., w. i. | 3/2 | 6 | $3,401 \\ 10,358$ | 692 360 | 21 52.35 | | 4,663 6,774 | 25.5 45 | 65.32 20.09 | 209 | $\frac{346}{1,307}$ | 7.4 19.39 | 24 32.38 | | is | 33 |
| HolyokeGal.,c.i.,ld.lnd. LynnLd. lnd. | 3/4 | 2 | 2,671 $27,572$ | 264 | 16 | 97 481 | 4,145 16,000 | 20.4 | 18.47 | 517 | 6,756 | 10 40 | 30 | 12 | 81 | 55 82 |
| MiddleboroCmt. lnd. New BedfordLd., w. i., c. i | 1/2 | 10 | 1,710 $26,476$ | 2,845 | 11.3 91.23 | 35 542 | 1,031 13,311 | 56 36.2 | 15.27 | 2,100 | 585 8,206 | 54.8 61.6 | 76.5 81.8 | 18 | 7 195 | 3 79 |
| | 1 3/4 | . 6 | 4,480 20,000 | 8,500 | 23.5 95.3 | 72 151 | 3,529 8,346 | 35 60 | 9.00 34.00 | 230 | 97 7,500 | 2 89.9 | 15 98.9 | | | 23 85 |
| North AdamsGal. | 3/4 | 10 | | | | 27 72 | 2,525 | 30 | 7.00 | 5 | 80 | 37 | | | 17 | |
| NorthamptonGal. N. AttleboroC. i., gal., ld. | 3/4 3/4 | 2 | 1,004 | | 16 5.7 | 44 | 3,400 ⁴ 1,239 | 22,5 | | 9 | 1,338 | 3 100 | 34 100 | 2 | 10 | 20 7 |
| PeabodyGal. ReadingC.i.,ld.,cmt.lnd | | 6 | 3,171 4,832 | 1,400 | $\frac{13.14}{20.7}$ | 77 57 | 2,776 $1,452$ | 25 84.7 | 14.00 47.14 | 43 73 | 233 1,333 | 8 91 | 62 | 1 | | 15 9 |
| RevereCmt, lnd., ld. | 5% | 4 | 6,110 | | 15.25 | 208 | 3,662 | 29.3 | 16.00 | 383 | 1,268 | 33 | | | • • | 39 |
| Somerville Ld., ld. Ind., cmt. Ind. | 1/2 | 6 | 8,068 | 600 | 80.48 | 208 | 12,357 | | | 716 | 6,526 | 53 | 59 | | 7 | 83 |
| Springfield Gal., ld. lnd., | 3/2 | 8 | | | | 440 | 12,985 | | | 801 | 8,414 | 64.8 | 71.8 | | 392 | 1458 |
| TauntonCmt. Ind., w.i. | 24 | 4 | 6,093 | | 52.99 | | 5,301 | 53 | • • • • • | 126 | 2,810 | 53 | 73 | | 21 | 295 |
| Turners FallsGal. WalthamW.i., c. i. | 3/4 3/4 | 10 | 450 5,679 | 10 500 | 2.5 50.2 | 73 | 563 3,901 | 25 60 | 8.20 31.21 | 180 | 632 | 16 | 26 22 | • • | 10 | 37 |
| WellesleyC.i.,cmt.lnd.,w. | 1/2 | 8 | 6,544 | | 24 | 63 | 1,184 | 50 | 10.00 | 63 | 1,247 | 100 | | • • | • • | 35 |
| WestfieldGal. | 3/4 | 2 | | * * * * * | | | | | | 6 | • • • • • | | | • • | | 20 |
| AlpenaW. i. | 5.5 | | | | * * | | 3,255 | | | 12 | 82 | | | | | 1 |
| Battle CreekC.i., id., gal. ColdwaterW. i. | 3/2 3/4 | 8 | 16,800 | 100 | 30 | 402 52 | , 5,516 1,580 | 27 20 | 10.81 | 437 | 5,318 | 96 | 89 | | 104 | ·i |
| DertoitLd. EscanabaGal. | 5% | 12 | * * * * * | | 2.0 | 6,322 | 97,341 | 65 | • • • • • | 886 | 9,713 | 10 20 | 42.2 50 | 6 | 42 | |
| GreenvilleGal. | 3/4 | | | | | 23 | 858 | 30 | 7.05 | | 6 | | | | | 3 |
| HollandGal. | 3/4 3/4 | i | | 40 | | 125 16 | 2,087 596 | 50 33 | 7.65 9.00 | 127 5 | 2,045 25 | 97.9 | 62.2 | • • | | i |
| IshpemingGal. LansingLd. | 3/4 5/8 | 1 | | 5 | | 600 | 7,350 | 30 254 | 12.00 | 25 500 | $\frac{1,557}{3,830}$ | 76 504 | • • • • | 2 | | 30 |
| ManistiqueGal. MarquetteGal. | 3/4 1/2 | 2 | 200 | | 2 | 80 52 | 360 2,003 | 25 | 12.18 | 26 | 18 953 | 47 | 54.3 | • • | • • | • • |
| MarshallLd., gal. | 3/4 | | | | | | | 20 | | | 30 | | | | | |
| Mt. PleasantGal. MuskegonGal., ld. | 3/4 5/8 | 2 | | | * * . | 12 280 | 675 4,447 | | 8.00 | 1 | 1,658 | 35 | 50 | | | |
| SaginawLd. YpsilantiLd., gal. | 3/4 -/4 | 11/4 | | | 18.09 | 590 36 | 5,871 $1,909$ | 30 | 15.50 | 105 | 341 813 | 6 40 | 50 | | 2 | 6 |
| Minnesota: BrainerdGal. | 5.6 | 1 | | | | 69 | 1,469 | | | | | | | | | 2 |
| DuluthLd., c. i. | 3/2 | î | 1,034 | 10 | • • | | 10,630 | 22 | 17.65 | 914 | 5,883 | 55 | 80 | 5 | 25 | |
| EvelethGal. FaribaultLd., w. i. | 3/4 | 6 | 765 2,610 | 570 | 5 · · | 51 | 875 667 | 15 45 | 8.00 | 62 | 25 636 | 3 95 | 87 | | 2 | 10 22 |
| HutchisonGal. Lake CityGal. | 3/4 3/4 | • • | * * * * * | | * *. | 10 | 150 450 | * * * * * | | 10 10 | 135 475 | 100 100 | | | | 2 |
| MankatoLd. MarshallLd. | 5/8 5/8 | 3/4 | | | | 27 18 | 1,315 168 | 40 | | 27 18 | 1,315 168 | 100 100 | | | | 15 |
| NorthfieldLd. OwatonnaGal, | | | | | | 27 | 369 600 | 50 | 5.00 | 26 10 | 192 60 | 50 | • • • • | | | io |
| Worthington Gal. | 3/4 1/2 | 2 | 1,000 | | 2 | 12 | 3004 | | | 3 | 15 | 5 | 33 | 8 | | 1 |
| Mississippi: Bay St. LouisW.i., gal. | 3/4 | | 1,500 | | | 35 | 365 | 75 | 10.00 | | | | | | | |
| GreenwoodGal. JacksonW. i. | 3/4 1/2 3/4 | 4 | | | 14 | iii | 4,000 | 18 | | 500 | 1,000 | 25 | | 7 | . 7 | 3 5 |
| NatchezLd., w. i. Yazoo CityGal. | 3/4 1/2 1/2 | 2 | | * * * * * | | 20 | 1,210 1,260 | 50 | 8.00 | 151 | 1,078 125 | 90 10 | 49 | | 5 | 54 |
| Missouri: | | | | | | | | | 5.00 | | | | • • • • | ** | •• | |
| BrookfieldLd. ButlerGal. | 3/2 3/4 | 1 2 | 7004 | | ii | 36 25 | 500 4004 | 150 754 | 10.00 | 30 5 | 396 754 | 93 | | | • • | 1 |
| Caruthersville Gal., ld. Farmington Gal. | 3/4 3/4 | 2 | | | | 12 | 350 | • • • • | | 6 12 | 350 | 100 | | • | • • | |
| HannibalLd., w. i. | 56 | 4 | | | 11.4 | 130 | 2,741 | | 10.00 | 24 | 209 | | | | | 5 |
| Kansas CityGal., w. i. Pierce CityW. i. | 34 56 | i | | | | 2,318 | 47,975 | • • • • | | | 22,346 52 | 46 | | | 24 | 12 |
| St. LouisLd. | 38 | 2 | | * * * * * | | 2,949 | 106,671 | | | 345 | 7,349 | 7 | 43.6 | | •• | • • |
| AshlandSt. ChadronGal. | 1/2 3/4 3/2 | 5/8 | 7,000 | | • • | 12 42 | 350 647 | 70 | | 31 | 3 423 | 1 | 3 | | | 2 |
| Grand IslandLd. | 1/2 | 2 | * * * * * | | | 100 | 1,400 | 25 | 0.50 | 100 | 1,400 | 100 | 100 | | 8 | 3 |
| Reno & SparksW. i. | 34 34 | 6 | | | | 572 | 8,650 | | | 572 | 8,672 | 100 | **** | *** | • • | |
| New Hampshire: Claremont Cmt. Ind., gal., | 3/4 | 23/2 | | | | 26 | | | | | 548 | 50 | 61 | | 1. | 5 |
| ld. Ind. | | 10 | 941 | | | | 1,088 | | * * * * * | 69 | | | | | | |
| Concord Cmt. Ind. Dover C.i.,cmt. Ind., | 1 34 | 8 | 805 | 119 8 | 87,099 18 | 38 18 | 3,738 1,919 | 23.3 43 | | 145 150 | 2,153 1,395 | 57.59 78 | 77.2 78 | | 10 | 42 |
| KeeneW. i., gal. | 34 | 6 | 1,080 | 0 0 0 p 0 | 12 | 27 | 2,052 | 25 | | 18 | 182 | 8.8 | 22.5 | | 18 | |
| | 34 | 11/4 | 19 | ***** | 10 | 45 | 588 | | | 1 | 1 | | | • • | 8 | |
| New Jersey: | 5.4 | | | | | | | | | | | | • • • • | • • | ** | |
| East OrangeLd., w. i., c. i. Kearney | 3/2 | 8 | 21,484 | | 81.0 40 | 370 250 | 7,198 3,200 | 58.1 30 | 21.19 | 540 3,200 | 1,302 | 18.1 100 | 18.9 | 4.17 | | 3 |
| For footnotes, see page 16. | | | | | | | | | | 1 | | | | | | |
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TABLE No. 4.—STATISTICS OF WATER WORKS OF THE UNITED STATES SERVICE AND METERS—Continued

| | | | | | | ME | ENS- | -Contu | nuea | | | | | | | | |
|----------------------------------|------------------------------------|--|--------|-----------------------------|-----------------|------------------------|----------------|-----------------------------|-----------------|---------------|-------------|------------------|-----------|-------------------------------------|--------|---------------|-------------------------------|
| Name of city. | Kind | of p | ipe, | Extended during year. | during year, | Total now in use | | No. now in | Aver- age | age | No. | No. now in | Serv- | cent. Receipts from metred | No. | No. uow in | No. of studpipe for st. |
| New Jersey (Contin | | From | 1, 10. | ft. | ft. | miles. | year. | use. | length. | cost. | added. | use. | tered. | water. | added. | use. | water'g. |
| Madison | | :: | .; | | | | | 931 | | | , | | 100 | | | | 5 |
| Millville Newark | | 3/4 5/8 | 1 | 46,736 | | 198.3 | 2,387 | 43,747 | 20 | 10.48 | 1.228 | 23,662 | 54 | 68 | • • • | 1 | |
| New Brunswick . | . Gal. | 1 | 2 | **** | | | 223 | 4,726 | | | 174 | 1,341 | 35 | 42 | | | |
| Paterson Perth Amboy | | . 34 | 5 | | | | 571 353 | 15,000 4,076 | 35 | | 148 | 7,843 $1,231$ | 50 33 | 49 78 | | | |
| Rahway | .Ld. | 5% | 8 | | | • • | 100 | 1,703 1,503 | 60 | | 1 | 175 | 10 | | | | |
| Ridgewood Vineland | | 5/8 3/4 1/2 3/4 | 2 | | | 1,524 | | | | | 4 | 474 | 24 | * * * * * | * * | | 1 . |
| Washington | .W. i. | 3/4 | • • | * * * * * | • • • • • | | • • • • • | | | | **** | | | | | | |
| New Mexico: Albuquerque | .Ld., gal., w.i. | . 34 | 4 | | | | | 2,300 | **** | | | 1,600 | 70 | | | | 25 . |
| New York: | | | | | | | | | | | | | | | | | , |
| Baldwinsville Binghamton | .Gal. | 1/2 | i | | | | 304 | 960 10,073 | 15 | | 404 | 3,265 | 33 | 54 | * * | 25 | 26 |
| Buffalo | . Ld., w. i. | | | | | | 1,635 | 77.260 | 15 | | 204 | 3.459 | 4.5 | 28.5 | | 19 | |
| Canandaigua Carthage | Lu, gal, c. i. | 3/2 3/4 | 4 | : | | *.* | 12 38 | 1,558 667 | 20 40 | | 22 | 1,637 | 100 67 | 100 | | 1 | 7 2 |
| Catskill | . Ld. | | | | | • • | 20 | 1,750 | | 9.00 | 20 | 170 | | | | | |
| Cooperstown | | 3/4 | 6 | 2,500 | | 20 | 99 | 2,100 | 50 | | 184 | 1,500 | 67 | 51 | ** | 8 | 2 |
| Dunkirk | . Ld., w. i. | | | | | | | | | | | 5,000 | 95 | | | | |
| East Chester New Rochelle } | .d., w. i. | 3/8 | 8 | | | | 299 | 6,005 | 20 | | 299 | 5,948 | 99 | 99 | | | |
| Pelhar | | | | | | | | | | | | | | 00 | • • • | | |
| Elmira Fairport | . W. i., ld. .Gal. | 3/4 | 8 | 6,860 | | 282 | 343 78 | 7,407 635 | 201 50 | | 328 50 | 3,269 472 | 80 | 80 | | 3 | |
| Frankfort | . Ld., w. i. | 1/2 | 11/2 | 594 | | 34 | . 22 | 596 | 27 | | 10 | 94 | 16 | | | 10 | |
| Geneseo | | 1/2 | 6 | 140 1,800 | 250 | 2.5 10.27 | 113 | 533 3,389 | 26 ⁶ | 16.90 5.20 | 20 | 227 12 | 43 0.5 | 53 3.8 | | 7 | 14 |
| Hudson | . Ld. | 1/2 1/2 1/2 | 1 | | * * * * * | | 36 | 1,500 | 30 | | 24 | 165 | 11 | | | 4 | 4 |
| Jamestown Lestershire | | | 1 | | | | 465 15 | 7,009 650 | | | 1,005 15 | 4,322 | 61 100 | 65 | • • | 5 | 5. |
| Lowville | . Gal. | 1/2 3/4 1/2 | | | | • • | 15 | 845 | 30 | | | 130 | | | | 3 | 1 |
| Middletown | Gal. Id. | 1/2 | | | | | 10 137 | 1,500 ⁴ 3,107 | | | 7 | 163 | 5 | 18 | | 4 | 10 |
| Mohawk | . W. 1. | 3/4 9/4 | | 400 | 100 | | 16 | 550 | 20 | 1.70 | 19 | 120 | 22 | 30 | | | .1 |
| Newark Newburgh | . Gal. . Ld. | | 21/2 | | | • • | 160 110 | 966 4,611 | 12 | | | 699 | 72 | **** | | | 15 |
| Niagara Falls N. Tonawanda | .Ld. | 34 5/8 | 1 | | | | | | | | | 1,7004 | 33 | * *** | | | |
| Oneida | | 9/8 1/4 | 4 | | | | 127 | 2,420 | 20 | | 150 | 25 900 | 90 | | | i | |
| Ossining | .Ld. | 1/2 | 2 | | | | | 1,548 | | | 24 | 1,200 | 75 | | | | 1 |
| Peekskill Potsdam | . W. i. | 3/4 | 3 | 2,400 | | 7.6 | 75 60 | 2,500 1,003 | 40 | 9.00 | 75 | 2,000 | | | | 4 | |
| Poughkeepsie | . Ld. | | | | | | | | | | | | | | | | |
| Salamanca Schenectady | . Ld., w. i. | 3/4 5/6 | 6 | | | | 58 696 | 1,371 17,864 | | | 1 8 | 21 | 1.5 | 6 | | * * | 1 |
| Sidney | . W. i. | 1/2 | 1 | | | | 12 | 557 | | | | | | | | | |
| Solvay | . Ld., w. 1. | | 2 | 1,000 | | 5 | 32 195 | 900 11,262 | 25 20 | 15 | 32 | 900 309 | 100 | 100 | | 3 | |
| Whitehall | . W. i., ld. | 3/4 1/2 | 1 | • • • • • | | | . 18 | 655 | | * *** * | 15 | 247 | 8 | | | 1 | |
| North Carolina: | C-1 : | 21 | 2 | | | | 477 | F.O.W. | 90 | | 0.4 | 40 | - | | | | _ |
| Elizabeth City Washington | | 3/4 | . 1 | | | | 47 | 587 500 | 20 75 | | 24 | 42 225 | 40 | | • • | * * | 5 |
| Wilmington | | 3/4 | | | | | 349 | 2,700 | 15 | 14.00 | 31 | 1,329 | 50 | | | 2 | . 18 |
| Ohio: Barnesville | .Ld. c.i. | 5/6 | 5 | 600 | | 1 | 45 | 353 | 15 | | 45 | 353 | 100 | 100 | | | |
| Canal Dover | .Gal. | 34 | | | | | 60 | 1,300 | | 6.00 | | 12 | | | | 1 | i |
| Cincinnati Cleveland | . Ld., c. 1. . Ld., gal., c. i. | 3/8 | 6 | | | | 4,090 2,763 | 51,366 83,011 | 16.1 | 9.347 | | 21,599 81,281 | 98.2 | 59.4 6 98.61 | 2 | 377 130 | |
| Covington | . Gal. | 3/4 | | 300 | | | 30 | 320 | 22 | | 30 | | 100 | **** | | 200 | |
| Delaware Eaton | | 3/4 | i | | * * * * * * | | 65 31 | 1,715 | 28 | 10.00 | 70 20 | 910 250 | 6Q 55 | * *** | 2 | . i | |
| Hicksville | . Gal. | 3/4 1/2 3/4 | i | ***** | | | 20 | 380 | | | | | * | * * | | | 1 |
| Leetonia Salineville | | 1/2 | | 500 | | 3 | 2 52 | 520 480 | 30 | 1.00 | 2 2 | 508 | 3 | 20 | i | 3 | |
| Toledo | .Ld. | 3/4 | i | 31,000 | | | 1,968 | 24,244 | • • • • • | 12.50 | | 19,856 | 80 | 60 4 | 9 | | 18 |
| Washington Waverly | | 3/4 3/4 3/4 3/4 | 2 | | | | 50 35 | 35 | 20 | | 17 | 1004 | 10 | / | | | |
| Youngstown | | | | | | | 1,700 | 12,641 | | | 581 | | 20 | | | | |
| Oklahoma: Davis | Cal | 3/4 | 11/4 | | | | 27 | 148 | | | 4 | 18 | | * | | | - 1 |
| Shawnee | | ** | | | | | 140 | 1,850 | 40 | | 140 | | 100 | | • • | | 2 |
| Oregon: | C-1 | | | | | | 0.005 | 50.005 | | | 400 | 10.000 | 040 | | | | 1 |
| Portland Pennsylvania: | . Gai. | • • | • • | * * * * * | | • • | 8,685 | 52,865 | | | 429 | 12,868 | 24.8 | * * * * | 7 | 103 | * * |
| Allentown | .Ld. | 56 | 1 | | | | 430 | 12,701 | 4 | | 6 | 88 | 0.7 | 9.3 | | 527 | |
| Bradford Carbondale | . Ld., gal. | 58 34 34 | 2 | | | | 27 90 | 3,855 5,675 | 18 24 | 3,000 | 12 | | **** | | | 2 | |
| Franklin | | | 3 | | | | | | 30 | | | 55 | * * * * * | * * * * * | | .6 | . i |
| Harrisburg | . Ld., gal. | 1/2 1/2 1/2 1/4 1/2 | 8 | | • • • • • | | 1,006 20 | 16,646 1,000 | | 14.00 | 672 | | | 84 | | 26 | |
| Huntington | .Gal. | 3/4 | | | | | , | 1,000 | | 14.00 | | 17 | * * * * * | | . 2 | 3 | 3 |
| Indiana | . Ld., w. i. | 1/2 | 1 | | | | 60 20 | 1,2004 | | | 35 | 600 | 50 | 50 | | 4 | 2 |
| McDonald Media | .Ld. | 5/8 | 1: | | | ** | 20 | 1,200 | 15 | | 20 | | 100 | 100 | ** | *** | 37. |
| Myersdale | . Gal. | 5/8 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2 | 1 2 | * * * * * | • • • • • | | 30 | 700 | 20 50 | * * * * * | 10 | 15 52 | 7 | 40 | | 2 | |
| North East Philadelphia | . Ld., w. i. | 1/2 | | | * * * * * * | | 8,230 | 320,000 | | | 10 | 2,011 | 0.7 | 40 | 28 | 5 | 1 |
| Reading | .Ld., w. i., c. i | , 1/2 | 8 | | | | 309 | 22,503 | | | 359 | 3,783 | 16.8 | 32.4 | 871 | 728 | |
| Shenandoah Susquehanna | . Ld., w. i. | 3/2 3/2 | 1 | | | | 10 8 | 3,700 800 | 20 | | 2 | 19 24 | 3 | 15 12 | ** | | |
| Rhode Island: | | | -1 | | | | | | | | 101 | | | | | | 14 |
| Westerly Woonsocket | | 3/2 5/8 | 10 | 2,409 2,541 | • • • • • | 10,384 | 68 173 | 1,934 3,355 | | 19.06 9.28 | 82 152 | | | 97.4 | ** | 12 17 | 54 |
| South Carolina: | | 78 | 20 | 2,511 | | 20,002 | 210 | 4,000 | 10.0 | 0.00 | 102 | 5,200 | 00 | 01.1 | | 21 | 09 |
| Florence | .Ld., gal. | 3/4 | 2 | 10,0004 | | | 1504 | | | • • • • • | 150 | | | 80 | | | 4 |
| Orangeburg | | 1/2 | 21 | | | • • | 73 | 750 | 32 | | 50 | 360 | 45 | 50 | | | · U |
| For footnotes, se | e page 16. | | | | | | | 1 | | | | | | | | | **** |

TABLE No. 4.—STATISTICS OF WATER WORKS OF THE UNITED STATES SERVICE AND METERS_Continued

| | | | | | IVIE. | I ERS | -Conu | nuea. | | | | | | | | |
|---|--------------|------------------|------------------------------------|---|---------|---------------------------------|-----------------------|-----------------------|---|------------------|---------------------|--|--------------------------------------|-----|---------------|---|
| | | | | Discon- | | | | | | Me | eters | | cent. | | rs and | 37 . |
| Name of city. Kind of pipe. | of pip-ins. | oe, | Extended during year. ft. | during | | No. added during year. | No. now in use. | Average length. | Average cost. | No. | | ices me- | Receipts from metred water. | | No. uow in | No. of stndpipe for st, water'g. |
| South Dakota: MitchellLd. YanktonLd. | 3/2 3/4 | 1 2 | | | 10 | 72 | 491 | 53 | | 72 | 490 460 | 98 100 | 100 | | | 2 2 |
| Tennessee: MemphisLd., w. i. | 3/2 | 6 | 34,536 | | | 1,749 | 21,227 | 25 | 9.65 | 2,125 | 10,806 | 51 | 66 | | 55 | |
| Texas: Clarksville | 3/2 | 1 6 1 2 | 10,204 | 603 | 30.6 | 50 50 521 43 | 330 1,050 7,875 | 60 75 20 | • | 50 3,718 | 104 475 8,181 | 30 65 94 | 65 75 | 10 | 65 | 1 :: i |
| Mineral Wells Gal. Utah: | 1/2 | 2 | | ***** | • • | 42 | 720 | 100 | • • • • • | 100 | 295 | 40 | 70 | •• | •• | 3 |
| LoganGal. Salt Lake CityLd. SpringvilleGal. | | i | 1,268 | | 5.5 | 80 879 32 | 940 17,000 253 | 18 39 65 | 7.15 7.40 | 34 | 604 | | 40 | • • | • • | 10 |
| Vermont: Burlington Gal., c. i., ld St. Albans W. i. | | 6 2 | 1,581 350 | 126 | 21.44 | 52 13 | 3,967 1,100 | 36 30 | 15.87 17.00 | 64 | 3,464 | 87.6 | 88.8 | 1 | 42 | iż |
| Virginia: CharlottesvilleGal. CovingtonGal. FarmvilleGal. | 1/2 | 2 1 2 | 2,000 1,000 | • | 15 1 | 41 100 25 | 1,760 1,0004 | | ***** | * * * * * * | 605 23 | 34.7 | **** | **: | 4 | 4 |
| Washington: HoquiamGal. SeattleGal. | 3/2 | 2 6 | | | | 3,134 | 1,750 39,013 | 30 35 30 | 10.00 | 6.430 | 250 28,259 | 11 15 80 | 12 74.5 | | | 10 |
| SpokaneGal. West Virginia: | 3/4 . | ٠ | | | 23.97 | 1,876 | ***** | • • • • | | 2,338 | | 20 | **** | •• | | |
| SistersvilleLd.6 Wisconsin: | | 1 | | | 108 | | • • • • | • • • • | * * * * * | . 1 | , 20 | 2 | • • • • | • • | 3 | , |
| AlgomaGal. AshlandGal. Berlin | 1.4 | 2 | | | 187 | 12 | 1,898 | 62 | • • • • • | 14 148 49 | 35 485 361 | 18 25.5 674 | 8 | • • | | 5 |
| Eau ClairGal. Ft. AtkinsonW. i. | 3/4 3/4 . | 2 . | | | • • | 150 30 | 2,700 550 | 45 ⁶ 35 | • • • • • | 300 30 | 1,450 550 | 50 100 | 70 100 | • • | 3 | 2 |
| MilwaukeeGal. NeillsvilleGal. RipanGal. | 3/4 | 2 2 | | | 8 | 4,298 12 10 | 56,151 309 707 | 65 60 | 7.00 | 2,240 12 5 | 55,291 307 93 | 98.3 99.6 13.1 | 85.2 15 | • • | 236 | 1 |
| SuperiorLd. WatertownLd. | 3/4 | 1 2 | 1,910 | | 7.1 | 85 | 1,117 | 20 | 8,57 | 770 86 | 3,359 1,111 | 99.4 | 95 | •• | | |
| WausawLd, WauwatosaLd, | 1/2 5/8 | 1 | | | • • | 60 70 | 2,282 | 25 50 | 18.15 | 10 88 | 100 485 | $\begin{smallmatrix} 4\\95.3\end{smallmatrix}$ | 6 | • • | i | |

¹ Mostly riveted.
² Lead lined.
³ On factories, etc., only; no houses metered.
⁴ Approximate; estimated.
⁵ Lead to curb, wrought iron beyond.

Includes to curb only.
Average cost of ¾-in. services.
Also 30 track hydrants for car sprinklers.
Also 9 track hydrants for fire sprinklers.
Meter 13,231 taps.

SIDEWALK OBSTRUCTIONS

It is difficuilt to understand why city authorities are so unconscious of or indifferent to the interference with the



OBSTRUCTED SIDEWALK CROSSING.

free and unobstructed movement of pedestrians in the majority of cities. An obstruction in the roadway is generally tolerated only so long as it is necessary; but sidewalk obstructions are allowed to remain for years even when they serve no useful purpose whatsoever. The illustration shows obstructions in the line of a sidewalk and its corresponding street crossing, consisting of two poles and a dead tree, which hardly leave sufficient space for two persons to pass either side of the tree. As the tree has apparently been dead some time there seems to be no reason why it should not have been removed, and thus do away with much the greatest part of the obstruction. This photograph was taken on the main residence avenue of a large city in the Middle West.

What City Planning Is

There is a notion, all too prevalent still, that city planning is purely a question of landscape architecture; but those of us who have had to do with the actual work of the government of cities realize that dependence must be placed upon the engineer for the laying out of subways, streets, sewers and water systems, which are in a sense the skeleton over which this great organism is developed. The city governments themselves have recognized this, and while we may not have reached the position of Paris, which is said to have in its municipal departments the finest engineering corps in the world, it is a fact that the cities of the United States perforce give recognition to some of the ablest members of this profession. The tendency, moreover, to include in the conferences heads of city departments is encouraging to those of us who realize how practical and human this entire question is. From its very nature city planning must assume a somewhat critical attitude. It expresses a noble discontent; but it will defeat its own purpose if this criticism goes so far as to attach blame indiscriminately to the men who, hampered by difficulties of every sort, by legislative restriction and popular apathy, are seeking a way out and endeavoring to accomplish to the best of their ability the tasks that are assigned them. There should be no attitude of superiority on the one side by side for a common end.—Mayor John F. Fitzgerald, of Boston, in an address before the Fourth National Conference on City Planning.

We commend the italicized words to the consideration of all who are endeavoring to improve municipal conditions along any lines, for its applicability is not confined to city planning.

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Municipal Journal

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JULY 4, 1912.

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Water Works Statistics

We give in this issue the remainder of the water works statistics collected by us recently, the first half of which appeared in the issue of June 20. Many engineers have found similar tables previously published by us to be of great interest and value, using them for reference from time to time as occasion arises, and we would suggest that all our subscribers who are not in the habit of saving and binding their copies of Municipal Journal (we trust the number is small) at least make sure that the papers containing these tables are preserved for future reference.

Among the facts which can be derived from these tables are: The extent to which meters are used in the various cities of the country; the ratio between length of mains and number of fire hydrants, both in the entire system and in the extensions laid during the previous year; the kinds of pipe used for service connections; to what extent special standpipes are provided for filling watering carts; the number of service connections per mile of main; the extent to which different methods of purification are used

An illustration of how tables of this kind have been used is furnished by one city in which council objected to permitting the superintendent to place as many fire hydrants as he desired when building extensions, citing a neighboring city as a support of their belief that one fire hydrant in 800 or 900 feet was sufficient. Fortunately the super-

for treating supplies from each of the various sources, etc.

intendent was able, by referring to the table, to show that the city referred to was an example of bad practise and that the majority of cities found it advisable to establish twice this number of hydrants, and these figures won his

point.

Tables such as those presented by us from time to time are, like the dictionary, very dry reading; but also like the dictionary, are essential for reference. The preparation of them involves an immense amount of labor, but we believe that we cannot employ it in any way more beneficial to municipal officials, and we are confirmed in this belief by the hearty commendation of them which we have received from many of the leading municipal officials and others interested in municipal work throughout the country.

Philadelphia City Controller's Report

The annual report of John M. Walton, city controller of Philadelphia, for the year ending December 31, 1911, shows an improvement over last year's in the asset and liability, revenue, expense and fund system of accounting. It contains a summary consolidated balance sheet, a general account balance sheet, with the operation and surplus accounts; a capital account balance sheet, with the permanent properties, debt and sinking fund accounts; a special and trust account balance sheet, and fund balance sheets, showing the condition of funds and appropriations. Schedules are presented showing in detail the expenses for 1911, and the advances between the general account and the capital account.

A schedule is given of the permanent properties of the city, resulting from the audit of the property inventory taken at the close of 1910, together with additional properties not included in the original inventory, and acquisitions during 1911, with the resultant figures at December 31, 1911. This schedule shows the cost value of city property in the possession of each department and bureau. The totals of land, structures and non-structural improvements and equipment are shown separately. In addition, structures and non-structural improvements are divided in this schedule into eleven sub-classes and equipment into nine sub-classes.

A detailed statement of expenditures by objects, upon the classification prepared by the President's Commission on Economy and Efficiency, is shown in Exhibit "F.", Prior to 1911 an analysis of expenditures was made by appropriation items only, making comparisons between different divisions of the city and county government with a view to economy and efficiency extremely difficult, if not impossible.

Municipal Ownership in Birmingham

THE United States Consul at Birmingham, England, Albert Halstead, reports as follows concerning the financial success of municipal ownership in that city:

"Birmingham owns and operates its water, gas and electric supply and the street railways serving the city. From the accounts of these four undertakings for the municipal year ended March 31, 1912, it appears that the first three had a total profit, after making the usual allowances for sinking fund, depreciation, etc., of \$740,910, but that the

water department had a deficit of \$355,731, a reduction of \$9,655 from the previous year. However, the water department charged only \$316,323 of this deficit to taxation, the balance being applied one-half to capital account and the other being carried forward.

"The gas department, after expenditure for maintaining the plant at the highest degree of efficiency, allowance to public lighting account, sinking fund, etc., had a profit of \$392,634, an increase of \$24,526 over the previous year and the greatest amount on record. In addition, there was \$15,977 interest on the reserve fund, which, with the profit, was applied for the relief of taxation. The net average price of gas was reduced from 46 to 43 cents. The profits of the electric supply department applicable for the relief of taxation were \$113,083, an increase of \$23,301 over 1911. This surplus remained after the ordinary allowances for sinking fund, payment of interest on money borrowed, and carrying forward \$121,663 to the renewal fund. The Birmingham streets railways, after meeting interest and sinking fund charges and providing for the interest on the purchase money of a private line, placed \$243,325 to the reserve fund and had \$219,216 applicable for the relief of taxation."

STREET CROSSINGS OF RAILWAYS

Construction of Street Roadway Required in Kansas City—Concrete Foundation—Brick, Concrete Plank Wearing Surface

The council of Kansas City, Mo., has recently passed an ordinance requiring all steam railroads which cross the streets of that city at grade to construct the paving or carriage way in a substantial manner; specifying certain

methods of construction, but at the same time permitting the railroad company to employ other methods provided that these be "as substantial and suitable as that provided in the plans and specifications made a part of this ordinance; in which event, however, said company shall first file with the Board of Public Works such crossings, and obtain from said board permission to construct such crossings in accordance therewith."

Crossings are divided into two classes, known as heavy traffic and light traffic, the former including crossings of steam and street railroads and all crossings over which more than 1,500 vehicles pass on an average in 24 hours; all other crossings being deemed "light traffic."

In each case the railway right of way is to be excavated for a distance of 10 to 13 inches below the bottom of the ties and the sub-grade crowned 3 inches. Farmers' drain tile are to be placed on each side of this trench and continued to an outlet or a dry drain of crushed

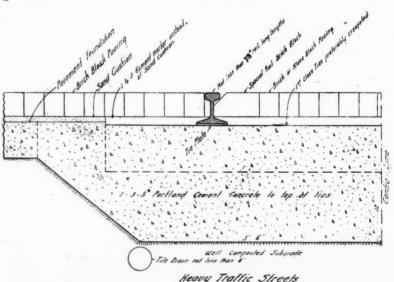
rock off the line of the street. The sub-grade is to be thoroughly compacted. For heavy traffic streets the trench is then filled to the top of the ties with 1:3:5 concrete, well tamped. After this has set a layer of one to three cement mortar is spread which has been mixed moist but not wet, and paving brick or stone block is immediately laid thereon. Paving brick is required to be of the best quality of vitrified brick block having an abrasion loss of not more than 17 per cent., which is to be carefully bedded and laid with closed joints and close to the rail. The joints in the brick are then to be swept full of one to two cement grout. The brick are to be laid flush with the top of the rail.

The illustration shows this standard construction, with brick block wearing surface.

This is considered the standard construction, but an alternate foundation and alternate surface are provided for. The former consists of substituting for the concrete, clean crushed rock tamped well beneath the ties until they are securely wedged and bedded. The interstices in this crushed rock are then filled by pouring in one to three cement grout until it flushes to the surface of the crushed rock, immediately after which concrete is to be placed on top and the construction carried on as previously described. Instead of brick paving, the concrete placed between the ties may be carried up to the top of the rail, being beveled off on the inside of the rail, and given a broom finish with thick grout on top. In all cases frogs, etc., are to be filled with 3½-inch oak plank.

Where traffic on the railway is very heavy, so that it would be impossible for a concrete foundation to set, the sub-grade may be excavated 20 inches below the ties and ballasted with clean, crushed rock thoroughly tamped and wedged beneath the ties; concrete being laid on top of the ties and the construction continued as before described.

In the case of light traffic streets the excavation is made as first described and ballasted with clean, hard crushed stone thoroughly tamped and wedged around the ties and level with the top of the same; or the foundation may be of concrete as specified for heavy traffic streets. The wearing surface is then made of oak timbers the same height as the track rails and laid parallel with these, resting upon the ties and entirely filling the space between rails and for 18 inches outside of them, these being securely spiked to each alternate tie with at least two long boat spikes. Oak or fir timbers are to be used. All high places or unevenness to be adzed off to a smooth surface.



STREET CROSSING OF RAILWAYS. CONSTRUCTION SPECIFIED FOR HEAVY TRAFFIC STREET.

Assistant City Engineer Clark R. Mandigo informs us that while it is not expected that these crossings will last indefinitely, they will undoubtedly be a great improvement upon flimsy plank crossings which are always out of repair. Heretofore the railroads have used 2½-inch plank shimmed up to the proper height and spiked. These planks warped, the shims worked loose and within 30 days the crossings were in bad shape. By using heavy timbers the full height of the rail, with no joints in the rails on the crossing, he believes that these difficulties will be avoided. One of the railway engineers has stated that the brick surfaced concrete crossings, including new ties under the rails, would cost \$5.75 per foot in place.

NEWS OF THE MUNICIPALITIES

Current Subjects of General Interest Under Consideration by City Councils and Department Heads—Streets, Water Works, Lighting and Sanitary Matters—Fire and Police Items—Government and Finance

ROADS AND PAVEMENTS

New Bridges in Allegheny County

Pittsburgh, Pa.—Three more Allegheny County toll bridges are to be made free. They are the Millvale and Sharpsburg structures over the Allegheny River and the bridge at Boston, Pa., spanning the Youghiogheny River. Their purchase will cost the county about \$500,000.

Something Wrong About Way of Applying Oil

Niagara Falls, Ont.—The automobilists of this city and every other owner passing through are raising an outcry against the present method of oiling the streets. The oil that is being put on is very thick, and during the present cold spell will not spread and soak into the ground, but simply lies in clots, and the wheels pick it up and throw it all over the vehicle, precisely the same as if it were mud.

Paving Augusta Streets with Creosote Wood

Augusta, Ga.—Augusta is now paving a portion of three streets in the vicinity of the union depot with creosoted wood block, and this noiseless pavement is expected to prove very popular as well as highly efficient. The paving will be laid around Barrett plaza and the new quarter-of-a-million-dollar Government building. The city is also paving 12th street, the busiest crosstown thoroughfare, to the southern limits of the city, a distance of three miles.

Magnificent Highways for Southern County

Los Angeles, Cal.—The latest estimate of Frank H. Joyner, construction engineer of the Los Angeles County Highway Commission, shows that 230 miles of the county's system of good roads have been completed. Fifteen miles of the road are in progress of construction. Fifty-two miles remain to be contracted. With the assistance of the county, which is paying for all shoulders to the various roads, the funds remaining in the \$3,500,000 bond issue will be sufficient to finish the 52 miles of road yet untouched. the completion of Sunset boulevard and the Altadena drive, now nearly done, it is possible to start in any direction from the city and find a splendid macadam road. The longest county road is the San Fernando road, now completed nearly to Newhall tunnel. Harbor boulevard is the heaviest and broadest road and cost the county nearly \$12,000 per mile. Altadena drive, just approaching completion, is said to be the best example of road making in the county, and cost about \$7,500 per mile. The cheapest contract is the Vernon-Downey road, which will not exceed \$7,500 per mile.

Would Sell Lots to Complete Boulevard

Salt Lake City, Utah.—A scheme by which the Commissioner of Parks believes he will be able to raise sufficient money to complete the City Creek Canyon scenic boulevard at once has been worked out by the commissioner. It involves the sale of four lots owned by the city at the mouth of City Creek Canyon. The commissioner estimates that it will require from \$6,000 to \$8,000 to complete the boulevard. He believes the lots at the mouth of the canyon will bring ample funds to do the work. The property lies along Canyon road, where the bed of old City Creek formerly lay. There is about 200 feet frontage along the boulevard and a depth of about 130 feet. This would make four 50-fot lots of 130 feet depth. This scheme of raising the money for the boulevard will be taken up with the commission at once, and if the commission will approve the proposition bids on the property will be advertised for.

Material Ordered for New Road

Indianapolis, Ind.—The County Commissioners have bought the material to be used in the construction of the Mars Hill road, and the work will begin at once. The road is in Commissioner James Kervan's district, and he declares that when it is finished it will be the best road in the county. The roadway will be 24 feet wide, and will extend from the city limits to Mars Hill, the route being that now known as the Maywood road. The road will be built of broken stone topped with a filler known as Tarvia X. This will be a type of macadam construction not heretofore used in the county. "I believe in good roads," said Mr. Kervan, "and this board has consistently built good roads since I have been a member. There are four thoroughfares in my district, and before I get through they will all be improved as permanent roadways. I am especially interested in this new Mars Hill road because there is already a great deal of heavy traffic over it, and when Mars Hill is in operation this traffic will be greatly increased. We are going to use a method of construction which will produce a road that will be a pleasure to travel over. If by spending some money to build a road we can help to make this new town grow," said Mr. Kervan, "we will help the whole county. The land will be worth more and the improvements which will be made in the way of factory buildings and residences will increase the taxes. is the kind of improvement I like to help along." carloads of broken stone have been ordered for this road and 40,000 gallons of the filler. The county will do the work, and it is expected that the residents of the neighborhood will furnish most of the teams and wagons, as the improvement will be of great value to those owning farms and truck gardens in the vicinity.



Courtesy Newark News.

TEMPORARY BRIDGE SPAN SHOWING "JACK-KNIFE" DRAW.

View of temporary bridge over Passaic River, Newark, N. J., and old bridge about to be removed. The temporary structure will be maintained by Snare & Triest, who will brild the new \$200,000 span. This type of draw was necessary because of the limited right of way which the counties of Essex and Hudson were able to obtain. The temporary and old structures could not have been operated with draws of the swinging type.

City Has New Asphalt Repair Plant

Fort Wayne, Ind.—The asphalt repair plant purchased some months ago from the Hetherington-Berner people, of Indianapolis, has arrived in Fort Wayne, and the Board of Works will put a gang of men at work immediately erecting it on the foundations already prepared at the site near No. 2 pumping station. The plant will be ready for operation in a week's time, according to the city officials, and the work of resurfacing asphalt streets on which the guarantees have expired will be hurried along the remainder of the summer.

Farmers Plan Highway Issue

St. Joseph, Mo.—Buchanan County's farmers desire good roads, and at a large meeting held recently under the auspices of the Commerce Club's good roads committee it was voted to urge the County Court to submit a proposition for a \$1,000,000 highway bond issue as soon as possible. The plan of the Commerce Club is to float four \$250,000 bond issues, one each year. With what the county would derive from the sale of the bonds, from taxation and from licenses there would be available for road use the first year, after allowing for expenses, \$409,000. The second year the net amount would be \$394,500, the third year \$375,000 and the fourth year \$347,000, and so on up to the eleventh year, when the county could drop back to the 15-cent levy.

Will Begin Paving Work at Watertown

Watertown, N. Y.—Plans of the Board of Public Works and the city engineer's office are to commence the improvement of Arlington street at once. The street, which has long been known as one of the roughest in the city, will be macadamized and another link added to the chain of macadamized streets which now prevail and which will soon give a boulevard many miles long. At the present time there are about twenty-seven miles of improved streets in the city, and by the end of this summer several miles more will have been added. Work is progressing in the macadamizing of Meadow and Sterling streets.

Plowing Broad Street to "Sow" New Asphalt

Philadelphia, Pa.-Workmen have begun the resurfacing of Broad street in the busy district south of Chestnut street. A plow is used to turn up the asphalt. Unlike previous operations of this kind the work is being conducted with the least possible inconvenience to business. One-half of the street has been left free from all materials for public traffic. The traffic rule requiring automobiles to be "parked" in the middle of the street are not suspended, but the machines occupy the position below the stretch upon which the work is progressing. A large force of pavers has been engaged in the work in order to rush it to completion as soon as possible. It is is believed that within 10 days all the streets in the immediate vicinity of City Hall will have been resurfaced. Considerable work has been done in the outlying sections, and contracts will soon be executed for restoring to good condition all the asphalt streets which show signs

Natural Cementing Material Used for Paving

Des Moines, Ia.—W. H. Wray, of Oskaloosa, is in Des Moines to present to the Board of Supervisors a proposition for putting the roads of the county in first class condition at a cost of \$3,000 a mile. The new process is presented by the Western Boiler Pipe Co., of Monmouth, Ill. It is a natural product which is taken out of the gound near that city and which contains 27 per cent. cementing material. This product is mined and spread over the roads without any further preparation. It is tamped and rolled down, and when rained upon hardens into a paving closely resembling asphalt. Mr. Wray states that the preparation will last for years. He tells of roads in Warren County, Ill., that have been laid for seven years and are as good as ever. He will propose to the board that a hard road fund, such as Warren County, Ill., has, be started. It costs the farmer 13 to 17 cents per acre, assessed against his property, to put the road by his land. Mr. Wray states that the board of Warren County builds three miles of such road every year and the cost is hardly noticeable. He will suggest to the board that the members go to Monmouth to see it, with a view to making the road to the army post of this material.

SEWERAGE AND SANITATION

Will Let All Sewer Work in One Contract

Janesville, Wis.—All sewer work projected for this year is to be let under one contract, according to a statement made by Mayor Fathers. Hitherto separate bids have been asked for each extension. The council believes that economies can be effected by the change, as contractors can do the work with less expense and submit lower bids per unit of construction for large jobs than they can for scattered smaller ones. It is a distinct advantage to the contractor to do all his season's work in one place. He can keep his men at work steadily and is not put to additional expense for transportation of tools and machinery. The council will make every effort to insure the completion of all sewer construction projected before cold weather sets in.

Progress of Cleveland Sewerage Plans

Cleveland, O.-While the State Board of Health at its meeting at Toledo did not approve the plan of dividing the Cleveland intercepting sewer system into three parts and treating the sewage at three places, it is believed that the approval will be given at a later meeting to be held in Cleveland. Five of the six members of the board favored the plan, but John W. Hill, engineer member, who has not looked over the situation in Cleveland, wanted to inspect the proposed sites. The State officials have decided to invite city officials to attend a meeting in Cleveland in July to show why immediate steps should not be taken to clean up the Cuyahoga River, which was referred to as a cesspool and menace to health. This is the first official step in the procedure under the Bense act, which gives the State Board of health authority to order a city to issue bonds to install sewage disposal plants. The entire intercepting sewer system and the sewage disposal plants will be completed at a cost of \$3,000,000. The city now has \$1,000,000 in hand for the work.

Power Proposed from a Sewer

Buffalo, N. Y .- A plan is being developed by the municipalities of the Niagara frontier for the building of a trunk sewer, or sewerage tunnel, between Buffalo and Lewiston, to take care of the sewage of the cities in that locality and at the same time produce electric power in large quantities. A joint commission, with representatives from the cities of Buffalo, Lackawanna, Tonawanda, North Tonawanda, Lockport and Niagara Falls, is to be formed to prepare detailed plans to place before the New York State Conservation Commission and secure the co-operation and necessary action by that body. Chairman Van Kennan of the commission has stated that he is in favor of the proposed sewer and power development plan and considers it practicable. The flow would be rapid in the deep underground tunnel sewer, as there is a fall of 250 feet between Buffalo and the escarpment at Lewiston, and engineers figure that 250,000 horse power or more could be developed. The project includes a sewage disposal plant at the foot of the escarpment.

Recent Operation of Flushing Tunnel Stirs Up Sewage

Milwaukee, Mich.-After lying idle since last fall, the flushing tunnel pumping station is again in operation. Odors near the Milwaukee River for the last few days have been due to a sudden upheaval of the sewage which had collected at the bottom of the river while the flushing tunnel was not in operation. Public Works Commissioner Simmons said the impurities would be swept into the lake within a few days. Residents along the river bank had become alarmed at the long absence of flushing facilities and many complaints had been made. It was feared that an epidemic of disease might result. The boilers were removed from the pumping station last fall by the Socialists and dynamos substituted. The plan was to conduct the power from the garbage incinerator plant, but it was ruled that the city had no authority to provide its own power. The result was that there was no method of working the pumps without reinstalling the steam boilers. This was not done. At a recent session of the council \$4,000 was appropriated to secure the current from the street railway company. A short contract with the city is now in effect.

All Typhoid Cases Traced to Outside Sources

Camden, N. J.—Of the 484 cases of contagious disease reported to the Camden Board of Health during the year ending June 15 but 27 were typhoid fever, a condition that speaks volumes for the city's artesian water. In every instance the typhoid sufferers were shown to have been almost daily users of water other than the Camden article. There were 177 cases of tuberculosis, 124 of scarlet fever, 153 of diphtheria, one of infantile paralysis and two of anthrax.

Amherst's Sewer System

Amherst, Mass.-W. C. Tannatt, of Easthampton, an engineer employed by the town of Amherst, expects to finish a survey for the new sewer system for the northwestern part of the town within a short time. The selectmen will then receive contractors' bids for doing the work, after which there will be a special town meeting to see what action the voters will take in the matter. It is now generally recognized that it is going to be a very expensive proposition. The town also has other sewers that need looking after, and new lines must soon be built. Much complaint has been made during the past few years because the streets have been so frequently dug up by the town, the Amherst Water Co. and the gas company. Perhaps it has been no worse than in most growing communities, but the digging could be considerably reduced if there was an accurate map available of all of the underground pipes. There is a map of the sewer system as first put in, but it was never very accurate, and but little attempt has been made to record the new connections and other changes. The same to some extent also applies to the water company. Mr. Hunt, who was for a long time the superintendent, knew just about where the pipe's were, and now Superintendent Elder has learned, after much hunting, the location of most of them, but in time another superintendent must take his place, and if an accurate and up-to-date map is not made he will have to go through the same process of pipe hunting with pick and shovel.

WATER SUPPLY

Thirty-nine Year Old Water Main Still Good

Lebanon, Pa.—Water Superintendent E. H. Shroff has tested samples of the iron pipe taken from the trench at Eighth and Cumberland streets, when he put a valve in front of the Nutting building, and found the iron to be very little affected by corrosion. The pipe is part of the original twelve-inch main laid in 1873, 39 years ago, when the town, then a borough, established its municipal water plant. Superintendent Shroff says the cast iron pipe of that day, made of charcoal iron, was superior to the iron pipe made to-day by other processes. It suffered very little from corrosion, outside or inside, as proved by the sample.

Inspecting Improvements at Reading

Reading, Pa.-Members of both branches of Councils, the heads of all city departments and former members of the Board of Water Commissioners participated in the annual inspection of Reading's superb water works system. The entire party, to the number of about 50, left city hall in automobiles. The Maidencreek pumping station, filtration plant and raw water conduit were first visited, and it required the greater part of the morning to get over the ground. From here the party proceeded to the Bernhart filters and reservoir. Superintendent Nuebling explained the improvements in progress and others completed during the past year. At the Maidencreek and High Service pumping stations, the Bernhart, Hampden, Buttonwood street, City Antietam and Egelman reservoirs and the Bernhart, Antietam and Egelman filters everything was found to be spic and span, efficient to the highest degree and beautiful as landscape gardeners and efficient administration can make them. The Maidencreek filters are so rapidly nearing completion that before the end of next year they will probably be in service. One of the many notable features was the improvements of the picnic grounds at the Hampden reservoir, where many conveniences have been installed, including tubs with running water for the washing of dishes and stoves on which coffee and warm dishes can be prepared.

Lay Water Main Across Barge Canal

Rochester, N. Y.—The picture shows a difficult bit of work which has just been completed on the Henrietta road.



Courtesy Rochester Evening Times.

THE 24-INCH WATER MAIN CROSSING CANAL.

Superintendent of Water Works Repairs George E. Cripps, who engineered the task, is shown in the foreground. This pipe has been crossing the canal by means of a 45-foot drop on the south side of the canal. It was necessary to raise it on both sides, lay the connecting link shown on the hanging ledge attached to the roadway bridge, and connect up the ends.

Atlantic City Water Free of Bacteria

Atlantic City, N. J.—"Atlantic City water is about the healthiest beverage in existence." This is the substance of a report received from the State chemist. A week ago Superintendent Van Gilder of the Water Department, drew a tin cupful of water from the spigot at city hall, bottled it and sent it to the chemist. The report follows: Color 30 (slightly tinged), odor very slight, turbidity very slight; nitrogen as ammonia, .012; nitrogen by permanganate in solution, .032; as nitrites, 0; as nitrates, .04; chlorine, 7.0; alkalinity, 1.0. This report is based as per million.

City's Water Contaminated

Rochester, Ind.—Dr. M. O. King, city health officer, has ordered one of the city building drinking fountains closed on account of finding the water contaminated with typhoid germs. The other fountains over the city are being watched to prevent water of like nature from being used. One case has been traced directly to the closed fountain, and other cases are being guarded to head off an epidemic. The water used in the city's fountains is from driven wells operated by force pumps, and it is feared the water under the entire city may be affected.

Pumping Station Under Common Has Chamber's Support

Boston, Mass.-Approval of the plans of Louis K. Rourke, Commissioner of Public Works, for the location of the proposed pumping station for the high pressure fire service under Charles street between Boston Common and the Public Garden is contained in the report of the committee on municipal and metropolitan affairs of the Boston Chamber of Commerce which has just been issued. The report also favors having the proposed central fire alarm station made a part of the pumping station. The committee has prepared a drawing showing the staircase with entrance and exits concealed in and forming a part of a gateway to the common, framing the Commonwealth avenue pathway. The drawing is by Harry J. Carlson, a member of the committee. Installation of the system of high pressure fire service is to cost \$1,000. The chamber committee says in its report that the sentiment against encroaching on the common has been considered and that this plan should meet with no opposition. Proximity to the metropolitan mains and minimum fire danger are attained by it, the report says.

Valuation of Water Works

St. Louis, Mo.—A complete inventory of the St. Louis water works system, with a view to discovering if it is possible to revise rates on a more equitable basis, was provided for in a resolution adopted by the City Council. President John H. Gundlach is its author. It provides the Public Service Commission shall make a thorough inquiry into the subject of water rates and consider what the present property should return to the city in funds.

STREET LIGHTING AND POWER

Completes Chain of Gas Plants

Anderson, Ind.—When the Central Indiana Gas Co., understood to be a part of the Dawes syndicate of Chicago. acquired the gas plants in this city, and also at Greenfield and Elwood, recently, it practically completed a chain of artificial gas plants in the old natural gas belt, all of which will soon be connected by a web of pipe lines.

Cannot Charge for Installing Meters

Olympia, Wash.—The Public Service Commission laid down the rule that public service corporations cannot charge the patrons for the use of a meter and that the companies are required to install a meter if one is demanded without charge of any kind to the consumer, either for the meter or for rental for its use. The case came up from Bellingham, where a firm complained that it had been served notice by the gas company that in event it did not deposit \$35 to cover the cost of installing a meter that it would be left in darkness.

City Plans Elaborate Electrical Display

New York, N. Y .- Plans for the lighting of 15 of the city's parks on the nights of July 4, 5 and 6-the most elaborate Fourth of July display ever attempted in the city-have been announced by the Mayor's committee which has in charge the Independence Day program. More than 100,000 electric-cal bulbs will be used. The wiring and all the expenses of stringing, as well as the current, will be the gift of the New York Edison Co. to the city. The lights all over the city will be turned on at the same moment. The lighting in City Hall Park will be particularly elaborate, and there will be searchlights on the roof of City Hall. These lights will be turned on many flags festooned in the trees and over the footpath Other parks which will be illuminated are Columbus Mulberry, Abingdon Square, Hamilton Fish, Chelsea, De Witt Clinton, Riverside (at 83d street, Carl Schurz, Jefferson, Mount Morris, McKinley Square, Rutgers Square and Recreation Park (101st street and Second avenue). In the East side celebration there will be two meetings on the morning of the Fourth, one at Seward Park and the other at Hamilton Fish Park. Addresses will be made by Mayor Gaynor and Jacob H. Schiff. In the evening there will be band concerts in all of the East Side parks and fireworks in several of them.

Lighting Contract with Municipal Ownership Provision

Atlanta, Ga—In a five-year contract with the Georgia Railway and Power Co, that the electric light committee will recommend to Council is a provision that aims at the beginning of a municipal lighting plant in Atlanta. This part of the contract reserves to the city the right to cancel its agreement at the end of the first year, and is inserted in the expectation that the power from the new crematory will be used in a limited way for municipal lighting and will prepare for a municipal plant by which the entire city may be supplied in time. The new contract submitted to the committee reduces the city's electric lighting bill by \$20,000 a year. Under this contract rates for arc lights shall be \$50 each; formerly the rate was \$56. Series lights shall be \$22; formerly they were \$26; white-way lights, \$30; formerly they were \$45. The right is reserved by the city to install 800 flaming arcs at any time between now and Jan. 1. Under the new contract the city's yearly bill for electric lights will be \$110.000. Under the old contract the bill was \$130.000.

Public Service Has New Gas Rate

Trenton, N. J.—The Public Service Gas Co. has submitted to the State Public Utility Commission a new schedule of rates for municipal street lighting with gas lamps. The new rates were submitted voluntarily and will be put in force in municipalities at the expiration of present contracts, existing rates to remain in effect until a new contract at the reduced rates is executed. The new rates are for service furnished every night in accordance with the company standard street lighting schedule, approximately 4,000 burning hours per annum. The new rate for single mantle lamps is \$28 per lamp per year for the first 50 lamps; \$27 for from 51 to 150 lamps, and \$26 for over 150 lamps. A discount will be allowed from this rate amounting to one-half of 1 per cent. on one-year contracts, 1 per cent. on two-year contracts, 1½ per cent. on three-year contracts, 2 per cent. on contracts of five or more years.

FIRE AND POLICE

Birmingham Fire Loss Decreasing

Birmingham, Ala.—Owing to the energetic work of the police force in the enforcement of the laws for the prevention of fire and the prompt, efficient work of the fire department, the loss by fire in Birmingham during the last four months has been very small. The records will show that the loss for February, March, April and May of this year has been just half the total for those months in 1911.

Say Auxiliary System Should Reduce Insurance Rates

San Francisco, Cal.—That the auxiliary fire protection for San Francisco has reached such a stage of completion that the standard of fire protection in San Francisco is equal if not superior to any other city on the Pacific Coast is the opinion expressed in the report of H. A. Campbell, engineer for the municipal affairs committee of the Chamber of Commerce, read before the downtown committee of the weekly chamber luncheon meeting in the St. Francis Hotel. Acting upon this report and other correlated facts concerning the fire protection system, the Chamber of Commerce will make strong representations to the Board of Underwriters for a reduction in the present high insurance rate that will mean to the business men of the city a saving of approximately \$500,000 a year. The underwriters have already given assurance to the members of the downtown committee that a cut in rates is contemplated in fixing the rate schedule for next year, and with the presentation of the facts concerning the auxiliary system the members hope that the rates will be sufficiently reduced to effect the saving mentioned above. Mr. Campbell illustrated his report with a map of the city showing the location of the auxiliary mains. He said that with the mains already installed and tested the auxiliary system was adequate to control any possible conflagration in the business district, regardless of the effectiveness of the Spring Valley water system.

Knoxville's Losses Less Than Thousand

Knoxville, Tenn:—The fire losses for the city of Knoxville during the month of May were less than \$1,000, according to the report of State Fire Marshal John Oliver. Nashville's losses were the heaviest for months, due to one especially disastrous fire. The number of fires in Nashville, however, was but eleven for the entire month. The report for the four large cities is as follows: Nashville and Davidson County—Number fires, 11; damage to buildings, \$113,530; damage to contents, \$76,587; insurance carried on buildings, \$61,850; insurance carried on contents, \$69,000. Memphis and Shelby County—Number of fires, 40; total loss on buildings, \$21,820; damage to contents, \$12,105; insurance carried on buildings, \$92,378; insurance involved on contents, \$143,000. Chattanooga and Hamilton County—Number of fires, 13; damage to buildings, \$1,466; damage to contents, \$2,066; insurance on buildings, \$57,600; insurance on contents, \$68,800. Knoxville and Knox County—Number of fires, 15; damage to buildings, \$555; damage to contents, \$290; insurance involved on buildings, \$24,950; insurance involved on contents, \$6,950.

AUTO APPARATUS NOTES

New Machine Replaces Three Pieces of Horse-Drawn Apparatus, and Displaces Six Horses and Two Men—
Satisfactory Test in Richmond—Bad Accident in New Haven

Macon, Ga.—The automobile pump at headquarters that has been out of repair for the past several weeks will be ready for duty as soon as several bearings for the rear wheels arrive. The missing parts of the machine have already been ordered and will probably arrive within a few days. Since the car has been off duty the mechanicians at headquarters have been doing the repair work and have put the car in splendid condition. They will also adjust the bearings as soon as they come. The machine is the old pump that was the first auto fire machine ever purchased by the city and the one that was in the wreck at the corner of Fifth and Cherry streets. When the new parts have been added the machine will be almost as good as new and ready for duty again. The work of the mechanicians at the station has been pronounced excellent, as well as a great saving to the city.

Albion, N. Y.—The new combination hose wagon for the Dye Hose Company is expected about July 1. Ralph A. Roberts, of Buffalo, State underwriter and inspector for the district of Orleans, Niagara, Genesee and Erie counties, outside of Buffalo, visited Albion and made an inspection of the fire apparatus, water works system, etc. He was called here by the effort made to secure a reduced rate of insurance for the village owing to the addition to the local fire department of the new automobile combination, hose, ladder and chemical apparatus, such a request having been made to the State Underwriters' Association by representatives of the Albion Dye Hose Company.

Pasadena, Cal.—Chief Clifford, of the Pasadena fire department is looking for early delivery of the combination hose and chemical apparatus intended for the Mentor avenue fire house. He has received word from the Seagrave company of Columbus, O., which was awarded the contract, that the new apparatus has been shipped. The auto hose wagon and pumping machine ordered at the same time from another firm is expected to arrive soon. Chief Clifford is heartily in favor of the idea of having all the apparatus of the Pasadena fire department auto-propelled. He recently presented to the mayor and city commissioners an estimate of the cost and is hoping some action may be taken in the near future. He feels that the change would be beneficial to the city.

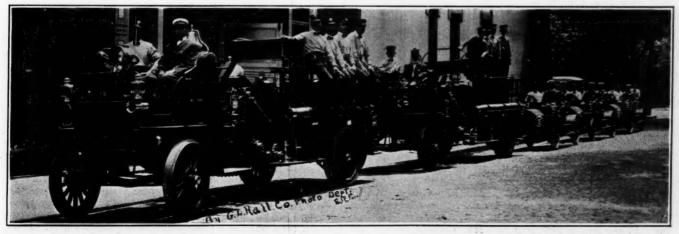
Richmond, Va.—Before the board of fire commissioners the new automobile fire engine shown in the illustration has been put through its paces and pronounced to be up to the standard in every way after the most severe tests. As a fire fighter it outdid the present automobile apparatus, and in the speed test those who were present at the trial would not say anything as to its speed, because it might result in the board again appearing in the police court on the charge

of violating the city ordinance against running motor vehicles beyond a certain fixed limit. The trials were, however, satisfactory to the board, and the new machine went at once to No. 1 engine house, which will be its home as long as it is a part of the Richmond fire fighting force. The machine was coasted down to the dock and the new engine was tried with single, double and combinations of hose, and in each instance a little further than requirements without any apparent strain to the mechanism. One new feature that particularly tickled the commissioners was the cellar nozzle. It is designed to put out fires where it is almost impossible for a fireman to stand and direct his hose, and from the demonstration no member of the board doubted its ability. One of the demonstrating force carried it to the top of the Chesapeake and Ohio viaduct. It deluged everything within a forty-foot radius. A member of the board said that the test could not have been more satisfactory and stated that there was not the slightest doubt but that the machine would be accepted at the next meeting of the board. The chiefs' automobiles were also tested and proved to be as successful as the engine.

Macon, Ga.—The new fire truck for the Macon fire department ordered a short while ago from the American-La France Auto Fire Apparatus Company will arrive in Macon in a few days. Notice has been received by Chief Jones of the shipment of the car. The new truck will be stationed at fire headquarters and the truck used at present will be stationed at the Monroe street department.

London, England.—As a result of the gradual conversion of horse-drawn fire brigades into motor-drawn ones and the consequent increase of speed with which they can go from one point to another, a decrease in the number of fire stations is ensuing. In connection with this the London County Council find that the proposed sub-stations at Brixton Hill, North End, Fulham and Roehampton will not be required.

Paterson, N. J.—The value of automobile fire apparatus in making quick runs to fires was shown when No. 10 engine company were called to take charge of an automobile fire on the Broadway hill. Half a dozen guests of Mrs. L. Stohn, of Hasbrouck Heights, were out in her automobile for a ride. When the machine was descending the Broadway hill on the westerly side the wires became crossed and the machine caught fire. The flames spread with such rapidity that the occupants jumped from the car to escape the danger. A telephone call was sent to headquarters and No. 10 engine was summoned to the scene. The fire engine arrived before the people calling for aid were out of the house where the telephone was used. Some time ago Fire Chief Stagg had the automobile apparatus equipped with small extinguishers for use in case the auto apparatus caught fire. One of these small extinguishers was used on the touring car and the fire stopped. The flooring, engine and dashboard were damaged. In many cases in the past before such quick runs could be made by auto fire engines it was no uncommon thing for touring cars to be a total loss under such conditions.



Courtesy Times-Dispatch, Richmond, Va.

Cleveland, O.—A fire horse famine is slowly but surely forcing the Cleveland fire department into motorization, according to Secretary Stillman of the fire department. If the department is not motorized it faces the alternative of making use of decrepit horses that will respond to calls willingly but inefficiently. "We simply can't get the horses," said Stillman. "The horses that we are now using have been in the service ten or twelve years, when a horse for good service should not be used longer than five years. Not long ago the department bought horses for \$300. Now we can't get the same kind of horse for \$350. From all appearances we simply will be forced into motorozing the

department.

Pueblo, Col.-Numerous changes in the local fire department will become effective immediately as a result of the formal acceptance of the new auto engine purchased by the city from the Victor Motor Engine Company of Buffalo at a cost of \$6,500. The truck will replace three pieces of horse-driven apparatus now stationed at Engine 2 in Bessemer, including a steam engine, an aerial truck and a hose wagon. It will result in the sale of six horses and a reduction in the force at the engine house from ten to eight men, that number being required to man the new auto car. Acceptance of the engine was made by the council, but not until numerous changes and improvements had been deanded and promised by Representative Miller of the Victor These were included in a report made by Comcompany. missioner Lannon, himself an expert machinist, after he had made an examination of the car. These included a new big gear on the pump, which gave way under the stress of the heavy test imposed by the fire underwriters, and other matters of a minor nature, including the speedometer, which was found to be defective. Mr. Miller also filed two bonds with the city, one for \$5,000 insuring the city for 90 days against trouble with the machine, and another one of \$1,000 to remain in effect during the life of the car, insuring the city against defective parts, all of which are guaranted by the company. One-half of the purchase price, or \$3,250, was paid, the remainder to be forwarded at the expiration of 90 days if the machine proves satisfactory.

New Hayen, Conn.—On the way to a fire in the home of Prof. Charles M. Andrews a new automobile pumping engine, traveling at terrific speed, crashed into a telegraph pole. So great was the collision that the engine was completely wrecked and the men riding on it were hurled to the pavement. Several of the firemen were hurt and Frank C. Blachley, who was caught under the wreckage, was so badly injured that hope for his recovery was abandoned. Behind the automobile engine came another engine known as the "Flying Squadron." In trying to avoid the wreck the second engine skidded against the curbing and also was

wrecked, but the firemen on it escaped injury.

Pittsburgh, Pa.—Six new electric motor patrol wagons have been ordered by the department of public safety and are expected to arrive next week. They will be used by the Central station, the Frankstown avenue station, the Oakland station, the Forty-third street station, the Northside station, and the Woods Run police station. Two electric runabouts have also been ordered for the use of the police superintendent and his assistant and will arrive with the patrols.

Good Test of Steamer

Chicago, Ill.-The new Ahrens-Fox Fire Engine Company's Continental engine has been inspected and put through an official test. The first test was witnessed by a large crowd, including the mayor and members of the city council. The water was first drawn from the boiler and fresh cold water pumped in. Then the charge of fire materials was lighted at the word "Go" and a record kept of the pressures. At the end of nine minutes the gage registered 60 pounds. At the end of ten minutes the specifications called for 100 pounds, but the engine exceeded them, showing 120 pounds of steam and pumping at 160 pounds of water pressure through 300 feet of 21/2-inch hose and 14-inch nozzle. The next test was through two leads of 24-inch hose, 300 feet each, and through two 14-inch nozzles, with which it had no trouble. Two leads of 300 feet each were then siamezed and water was thrown through 11/2-inch nozzle, at a pressure of 83 pounds at the nozzle and delivery of 775 gallons a minute, being 75 gallons over the specifications and rated capacity.

GOVERNMENT AND FINANCE

Civil Service Commission Plans New Pay System

San Francisco, Cal.—Two important plans for improvement and higher efficiency were discussed at a recent meeting of the Civil Service Commission. The first aims to provide every policeman with a manual which will include a digest of the city ordinances, rules of the department, hints on conduct, politeness and efficiency and other useful information. The commission will also take a hand in arranging for the payment of wages to city employes while the employes are at work.

Cities May Retain Control of Utilities

Los Angeles, Cal.—Cities of California retain their control of public utilities until such time as they shall vote that control into the hands of the State Railroad Commission, according to an opinion written by Max Thelen, a member of the commission, and unanimously endorsed by the four other members. Elections in Palo Alto, Willits and Santa Barbara on retaining control caused the action. Santa Barbara voted to retain all control, while the two others voted to give it to the State Commission. Under the constitutional amendment of October, 1911, all cities retain control of utilities with the right to fix rates until by vote it is surrendered to the State Commission.

Will Adopt Commission Government

Longport, N. J.—Longport has recently voted to adopt the commission form of government, 60 per cent. of the voters casting their ballots. Of the 40 legal voters 23 went to the polls, 17 voting to adopt and 6 to reject the Walsh bill's provisions. Mayor Ralph Harcourt, who was one of the prime movers in the petitioning to have the act adopted, will, in all probability, be a candidate for a commissionership, and with every chance of success. Longport will have but three commissioners instead of the five which they might have had if so desired, following Margate's lead in this small board plan. Atlantic City, Margate City and Longport have now adopted the commission plan, and, incidentally, just across the bay, Ocean City likes the plan and has taken it unto itself. Ventnor City is the only municipality in the vicinity which rejected the plan.

Asbury Park to Cost \$248,187 Coming Year

Asbury Park, N. J:—The Common Council of this city has adopted a budget for the forthcoming year of \$248,187.35, an increase of \$10,835.40 over that of last year. Of this total \$50,000 is provided by a special school tax, thus leaving the municipal tax \$198,187.35. With the county tax, the total figure last year was \$313,745.31.

Commission Plan to Be Submitted in Savannah

Savananh, Ga.—The plan of commission form of government which will be submitted to the people of Savannah has now been finally determined upon and it is awaiting the action of the Legislature to authorize the election. It was finally decided to fix the salary of the Mayor at \$6,000 per annum, with \$1,000 less for the four aldermen. The initiative and referendum and recall has been adopted. The eight-hour working law was rejected after a fight, and the departments will be conducted upon the civil service plan with open meetings of Council every two weeks. The Legislature will also be requested to pass a bill establishing the Australian ballot law in Savannah. If the plan goes through the change will be made here Jan. 1,

Commission Form May Be Put to Vote

Gadsden, Ala.—Gadsden voters are much interested in the pending fight on whether the city shall adopt the commission form of government. There are many who believe that the aldermanic system should be abolished. They contend that the losses being sustained by the city on account of the municipal water plant under the present system makes a change necessary, and they are endeavoring to secure action before the next municipal election. The opponents to these are fighting the commission form of government on account of the appointive feature of the bill. They say they are not willing to be ruled by men appointed by Governor O'Neal. While they favor the commission government, they want to choose their own commissioners. Petitions asking for an election on the subject are being circulated and the outcome is being awaited with interest.

STREET CLEANING AND REFUSE DISPOSAL

Power Street Sweeper Demonstrated

Spokane, Wash.—After sweeping over a mile of paving on North Wall street in record time and at about 33 per cent. of the cost of horse sweepers, the Briggs patented power street sweeper, demonstrated for the benefit of the Department of Public Works last week, broke down and had to call on Street Foreman Grant O'Kieff for help to get back to the city yards. Commissioner Coates, Assistant A. W. Swenson and City Engineer Macartney attended the demonstration, conducted by J. E. Briggs, the inventor, patentee and manufacturer of the machine. The officials went back to the city hall enthusiastic over the results. An hour later Street Foreman O'Kieff came in to say the contrivance had broken down shortly after the city officials left and had called on him for aid. North Wall street was swept in a little over an hour. On paper Mr. Swenson figured the cost was at the rate of 10 cents per 1,000 square yards. The average cost by power sweepers for April and May was 30 cents per square yard.

Street Sweeper Sweeps Too Thoroughly

Spokane, Wash.—Oileroid paving on East Olive avenue, laid last year, was given a severe test when the new power street sweeper was run over it. The powerful machine in places swept away the surface of the street. The big cylindrical broom brushed into the dustpan several cubic yards of the crushed rock, which is bound together by asphalt to form this class of paving. Commissioners Coates, Fairley and Fassett witnessed the demonstration of the new power sweeper. "The sweeper certainly cleaned everything off the street in great shape," said Commissioner Coates. "It's such a good sweeper that we are afraid it won't do for oileroid, as it takes the surface of the paving right along with it." Grand boulevard, Rockwood boulevard, Manito boulevard and other streets of the city are paved with a material similar to the East Olive paving, and the new sweeper, if finally purchased by the city, can probably not be used on these streets.

Street Cleaning Costs \$45 Per Mile

Richmond, Ind.—At an average cost of \$45 a mile, the fortyone miles of alleys and sixty-five miles of streets in Richmond have been cleaned, the work being completed last week. The total expense was approximately \$5,000, which was more than it should have been according to Street Commissioner Genn. He explains this by stating residents expected the street department to clean up all sorts of rubbish in any quantity, getting away with it. The street commis-sioner hopes that next spring's cleaning will not be undertaken until the board of works has ruled the amount which a resident can dump and have hauled away free and also rule as to what shall be considered rubbish for the department men to handle. Mr. Genn does not believe brickbats, rubbish from remodeled houses, sewers or walks, should be hauled by the department, but instead removed from the alleys by the property owner. He also believes that the department should not have to haul more than one load of rubbish from one place. An item of expense which made the cleaning more costly this year was that of teams. The street commissioner paid out \$486 more this spring than he ever did before. The reason is that feed is so high the teamsters will not work at wages formerly paid.

Oiled Road Causes Automobile Accidents

Paterson, N. J.-On the road between this city and Pompton so much oil was applied that traveling was made dangerous for automobiles and motor cycles. D. A. Speight, of Maywood, was driving his automobile near Pompton with a party of four when the car skidded, whirled around, and turned turtle. Mr. Seight's left arm was broken and one of the party was severely bruised. The other occupants of the car were not hurt. A similar accident occurred about a mile from the scene of the first, about an hour later. Skidding on the slippery road, the car of James Turpan, of Paterson, turned turtle, but the hood was up, and Turpan and the three other persons in the car escaped injury. Two motor cyclists met with accidents on the same road. The machines of both were upset. One of the riders had several teeth knocked out, and the other was bruised about the body and head.

Water Sprinkler Used to Spray Oil on Streets

Belvidere, Ill.—The job of sprinkling with oil Logan avenue from State street to the end of the pavement; First street, South State to Fourth and on Pearl street from East Pleasant to a point between Fifth and Sixth streets, has been

completed,

Work has commenced on East Lincoln avenue at Van Buren street and it will extend to Gardner street. The Borden people are to have the street near their plant treated and this will finish up the work now contemplated for this season. The work is done under the direction of Superintendent of Streets Homer Kennedy. A. Wakefield does the sprinkling, using the wagon regularly employed for sprinkling the streets with water. The oil is white and sufficiently light in density to admit of sprinkling by the ordinary method, being in consistency about that of kerosene. The property owners pay for the oil and the city the expense of sprinkling the streets. A tank car containing 8,100 gallons of the oil was delivered at the Standard Oil station at the Y and the oil was hauled from that point. The consignment will be about all used up when the jobs are finished. The cost to the property owners will be about five cents per running foot. The result of this oiling of macadam paved streets is, as has been demonstrated in other places to keep down the dust, make a binder to hold the surface to a considerable extent and make somewhat of an asphalt surfacing.

RAPID TRANSIT

Lynn's New Open Car in Commission

Lynn, Mass.—Car No. 6104, which has just been put in commission by the Bay State Street Railway Company, is one of the latest and most approved types in street car construction. This car is one of a number which are to be put on Lynn lines as soon as they arrive. The car is to run on the Peabody and Lynn line. One of many distingushing features of the new car is a water trough which runs along both sides of the roof and cares for the water which runs off the roof in a storm. Five of the hand grips on the outside of the posts between the seats are extended clear down nearly to the ground and these are hollow and serve as waste pipes to carry the water away. The car is also equipped with a lifting jack in compliance with the order of the railroad commission that 50 per cent. of all street cars must be so equipped by the first of July. The lifting jack is kept in a box beneath the front inside seat of the car. Every improvement is noted in the new car. There is a new type of fender which is different from those in general use at the present time. There are 14 seats in the car and it is equipped with arc lights.

New Line Between Atlanta and Macon

Atlanta, Ga.-Eighty-seven miles, Atlanta to Macon-one mile shorter than the Southern railway, the present shortest route-is what the Atlanta and Macon Railway company purposes to give the people of these cities and the intervening territory just as soon as remaining legal formalities can be complied with and construction can be completed. Backed by Chicago and eastern capital, with promoters eager to complete construction and begin operation, there is no question, says Hollins N. Randolph, counsel for the company, that the line will be built just as quickly as the Atlanta franchises are granted and the proposed stock and bond issues receive the approval of the railroad commission. Application has already been filed with the city council for franchises which will enable the company to enter Atlanta. It is to come in on the east, chiefly traversing streets now occupied by trolley lines. The terminus will be at the Equitable building, at Pryor street and Edgewood avenue. Hearing upon these franchises will be had before the council committee on electric and other railways early in July, About the same time the railroad commission will be asked to approve an issue of \$7,500,000 first mortgage bonds and \$3,600,000 common stock. The Atlanta and Macon railway will be operated on the third rail system, with modern safety devices, thus doing away with the cumbersome and some-times dangerous trolley wire. Operations will be conducted upon a block system, with the use of the telephone. Vestibuled cars with dining car service will be operated upon fast and frequent schedule, and passengers, freight and express will be handled.

MISCELLANEOUS

City Office for Blind Girl

Schenectady, N. Y.—Helen Keller, the blind, deaf and dumb woman, whose mastery of an education in the face of these handicaps made her famous, is considering the proposition of becoming a city official of Schenectady. The place for which Miss Keller has been mentioned is a membership on the board of public welfare, a body much favored by Rev. George R. Lunn, Socialist mayor of Shenectady. Miss Keller is a Socialist and is a believer in votes for women. Mayor Lunn intends that his new board shall have jurisdiction over tenement conditions, children's playgrounds and numerous other matters that do not properly come under any regular department of Schenectady's city government.

City Seal on Blankets

New Bedford, Mass.—The Beacon Mills are advertising New Bedford in some sample blankets that will be sent to police and fire departments of the large cities, three of which were exhibited by City Clerk Remington at the Mayor's office. The blankets are made in three colors—blue, gray and brown—and in the centre is a reproduction of the seal of New Badford, cleverly executed in the dyeing, around which is a circle with the lettering "New Bedford Fire Department." The idea was worked up under the direction of William J. Kerwin, superintendent of the mill, who has endeavored to produce a blanket that will be of service in municipal departments in which blankets are a part of the equipment.

Prizes for City Beautifying

Chicago, Ill—More than 2,000 teachers and pupils of the public schools have entered a contest for prizes offered by Charles H. Wacker for the most artistically kept school yards and for other excellencies in city beautifying. The names of the entrants have been placed with Dr. J. B. McFatrich, president of the Board of Education. The total of the prizes is \$1,000. They will be distributed among winning teachers and pupils for the benefit of the schools with which they are connected. Among the features of the displays will be window flower boxes at homes and school, clean homes and schoolyards, alleys and vacant lots.

Council Acts on Mine Caves

Scranton, Pa.—An ordinance regulating the mining of anthracite coal under the streets and public highways of the city, making it unlawful for reckless or careless mining of such coal, and providing penalties for violation of its provisions, has been introduced in council by Councilman Louis H. Johns. The action is the first of its kind ever taken in the history of Scranton. The ordinance is based upon the police powers conferred on the municipality by the State, under which powers the city has the right to safeguard the lives of pedestrians on the public streets. Penalties of \$100 or thirty days in jail are provided against mine officials who violate the terms of the ordinance. The introduction of the ordinance comes as the result of an agitation started several years ago by the Scranton Board of Trade. That body appointed Judge John P. Kelly and Attorney Milton W. Lowry to look ino the coal mining laws to discover some remedy against the mine cave evil. Their report pointed out that the police powers were about the only authority the city might fall back upon. More recently the same attorneys were retained to act in conjunction with City Solicitor David J. Davis in drafting an ordinance based on those powers, and the result of their conferences is embodied in the measure presented. The ordinance was referred to the public works committee of the council, and after a conference, it was ordered printed, copies to be sent to the coal mining companies and to all others interested in the legislation. It is probable that a public hearing on the measure, to which the coal company officials will be invited, will be held in the next fortnight, all of the councilmen joining in a resolution that since the matter is now formally before their body, no time will be lost in taking it under consideration and acting upon it.

Town to Buy Out Mines

Williamsport, Pa.—The people of Ralston, a village on the Northern Central railway, raised \$21,000 with which to buy the coal mines near the town, which have been idle for six years. The mines will be operated under the direction of a board of managers. They will employ two hundred men. The purchase of the mines is the industrial salvation of the town.

New Playground to Be Built

Denver, Colo.—R. W. Thornton, superintendent of playgrounds, has announced that the city will soon start the erection of a new playground in Elyria at Forty-eighth and York streets. The new playground will include twelve swings, eight see-saws, a merry-go-round, boys' gymnasium and a giant stride.

Playgrounds Become Busy

Boston, Mass.—The roof garden playground of the Washington school, tried experimentally last year, will be continued. Several new grounds have been opened, and the older ones equipped with better apparatus. There are 38 playgrounds, 24 of which are in school yards and the other 14 at corners of parks or public recreation spots. They are under the supervision of Dr. Thomas F. Harrington, director of school hygiene, his assistant, N. J. Young, and three supervisors, Miss Lulu Donovan, Miss Julia A. Murphy and Miss Helen G. Dolan. In addition, each playground has at least two, and frequently three, teachers on duty. The new equipment permits of 22 different games. There are merrygo-rounds, swings, tilts, giant stride, slides, tether ball, sand tables, checkers, jack-stones, blocks, ring-toss, bean-bags, jumping ropes, hoops, reins, puzzles, croquet, tennis, quoits and ring foil. In addition there are the supervised sports, baseball, track and field athletics, and classes in dancing, embroidery, and cutting for the older girls and in dramatics for the younger ones. Some of the playgrounds are equipped with showers which are immensely popular during the hot weather.

Over 50,500 Rooms in City Windowless

New York.—Social workers and physicians have long fulminated against windowless rooms in tenements. According to Commissioner John J. Murphy, of the Tenement House Department, there were in Greater New York in 1909 363,271 rooms which either had no windows at all or such small ones that there might as well have been none. The offending tenements were distributed among the boroughs as follows: Manhattan, 154,000; Brooklyn, 194,908; Bronx, 5,110; Richmond, 548; Queens, 8,705. On December 31, 1911, less than three years later, the records showed a total of 207,712-Manhattan, 66,950; Brooklyn, 130,319; Bronx, 2,442; Queens, 7,533; Richmond, 468. In the interval 160,000 rooms had been made legally light. "There are in Greater New York at the present time 50,500 absolutely windowless rooms," said Commissioner Murphy. "They are thus distributed: In Manhattan, 12,900; Bronx, 621; Brooklyn, 33,936; Queens, 2,857; Richmond, 186. We are steadily getting the number down, and by 1913 we hope to have an entire clean-up. The old house that has been turned into a tenement gives us the greatest trouble." Inspectors of the department do not pretend to give instruction to families. It is their business to see that the landlord makes the changes; then it is up to the people to take advantage of the improvements. But Miss Madge D. Headley, secretary of the tenement-house committee of the Charity Organization, says the tenants neglect to do so. "It is simply ignorance that prevents the people from taking advantage of such improvements," she says. "I have discovered that many times when a window has been cut through a partition, supplying an interior room with air, it has been blocked by backing a wardrobe or a cupboard against it. Or they hang heavy curtains up to them which exclude the light and air and also collect dust which the wind blows into the room.'

Plumbing Rules Printed in Pamphlet Form

Wilmington, Del.—The new plumbing rules and regulations recently adopted by the directors of the Street and Sewer Department have been printed in pamphlet form, and plumbers and builders are supplied with copies on application to the office. The regulations went into effect May 1.

LEGAL NEWS

A Summary and Notes of Recent Decisions-Rulings of Interest to Municipalities

Annexation of Territory—Conditions
White et al. v. City of Glasgow.—Where the petition for annexation filed by residents of territory adjacent to a city attempted to fix the conditions upon which the annexation might be made, the act of the city council, in accepting the petition and passing an ordinance of annexation which in no way noticed the conditions, did not constitute a binding contract by the city council to perform any of the conditions.—Court of Appeals of Kentucky, 146 S. W. R., 19.

Sewer Contract-Specifications-Quicksand

Blackstaff Engineering Co. v. Commissioners of Sewerage of Louisville.-The city commissioners of sewerage advertised for bids for a sewer, and furnished the bidders with approximate specifications of the work, the bids to be made on each item. The specifications recited that the underground objects were supposed to be approximately correct, but, should they be found otherwise, the contractor should have no claim on that account, and that bidders must satisfy themselves by personal examination of the actual conditions of the work. Held, that a bidder who encountered quicksand, instead of solid blue clay, as he expected, was not entitled to rescind the contract on the ground of mistake, even though that necessitated more timbering than he expected, and made the contract a losing venture.—Court of Appeals of Kentucky, 145 S. W. R., 152.

Annexation of Territory-Election Ordinances

State ex inf. Prosecuting Attorney ex rel. Hogan v. City of West Plains.-Where an ordinance, providing for the submission of the question to the voters whether certain territory should be added to a city, provided that the question should be voted on at the general city election and be conducted by the same judges and clerks, it properly failed to make separate provision for naming the judges or selecting the polling places, and other matters connected with the conduct of the election.—Springfield (Mo.) Court of Appeals, 147 S. W. R., 163.

Public Improvements-Defects in Proceedings

Webb City ex rel. Franks v. Aylor.—It is not the policy of the law, nor of the courts construing the statute relating to the making of public improvements in cities, to hedge these proceedings about with such technical restrictions as to defeat the purpose of the statute; and when there has been, in substance, a strict compliance with the statute, and no one has been misled or injured by technical variation from the letter of the law, and the contractor has performed his contract in good faith, the property owners will not be permitted to avoid liability; their substantial rights not having been impaired.-Springfield (Mo.) Court of Appeals, 147 S. W. R., 214.

Injunction-Right to Writ

Gray, Atty Gen., ex rel. Capelle et al. v. Mayor and Council of Wilmington et al.—The Court of Chancery will not restrain the mayor and council of a city from taking further action on a proposed ordinance providing for a sale of land owned by the city, though a recital in the ordinance of the relinquishment of control over the land by the board of water commissioners, which was a jurisdictional fact, be untrue; injunction being properly withheld until the last practicable moment, when it appears that the mayor and council will take final and illegal action.—Court of Chancery of Delaware, 83 A. R., 321.

Contracts-Lowest Responsible Bidder

Hallet et al. v. City of Elgin et al.—Where the board of local improvements awarded a local improvement contract to a bidder whose bid was not the lowest bid, but the board investigated the responsibility and experience of the bidder and the character of the improvement, and there was no evidence of wrongdoing on the part of the board, the court would not interfere with the discretion conferred by the board under Local Improvement Act.—Supreme Court of Illinois, 98 N. E. R., 531.

Taxation-Illegal Levy

Atchison, T. & S. F. Ry. Co. v. City of Humboldt et al .-Where an illegal tax is levied on the property of a taxpayer, which he is compelled to and does pay, it is to be regarded as an involuntary payment, which he may recover back; but if he pays the whole of such tax prior to Decem-, ber 20 of that year, including the second half due in June of the following year, the advance payment made to obtain a rebate is deemed to be voluntary, and is therefore not recoverable.-Supreme Court of Kansas, 123 P. R., 727.

Award of Damages-Relief

Clark v. City of Portland.—In a proceeding to enjoin the collection of an assessment of benefits in a street opening proceding for delay in appropriating the property beyond the statutory period, plaintiff cannot recover damages to his property, caused by the pendency of the proceeding, but must proceed at law.—Supreme Court of Oregon, 123 P. R., 708.

Civil Service—Removal—Salary

Cantwell v. City of New York.—Under Laws 1907, transferring jurisdiction over the Kings county jail to the Commissioner of Correction of the City of New York, and providing that every matron employed in the jail at the time of the transfer who prior thereto shall have passed a civil service examination shall be retained, where a matron possessing the requisite qualifications and having a fixed salary is summarily removed by the commissioner at the time of the transfer without charges being filed or any hearing being given her, and is kept out of her position until reinstated by a mandate, she is entitled to her salary for the period between her removal and her reinstatement, less the amount earned by her during this period, though she is not strictly speaking a public officer.—New York Supreme Court, 135 N. Y. S.

Public Improvements-Assessment-Injunction

Atchison, T. & S. F. Ry. Co. v. City of Cherryvale et al. Atchison, 1. & S. P. Ry. Co. v. City of Cherryvale et al.

—A city of the second class caused a street, which is
parallel to the railway tracks and includes a strip of the
right of way, to be paved. The strip has been used as a part of the street for over 20 years, without objection by the railway company, and has not hitherto been necessary for right of way purposes. In a former action it was held that the city should not be enjoined from paving such strip as a part of the street then being improved, but that such improvement should not give to the city or public any title in the land, or any interest that could ripen into a title by such user, or that would interfere with the use of the right of way. The city now seeks to charge the cost of paving such strip, together with other land used with it as a street, against the adjoining property, including the property of the railway company. It is held (1) that there is no authority to make special assessments upon the property of the railway company to pave this part of its right of way; (2) that the railway company may maintain an action to enjoin the collection of the tax assessed therefor; (3) that a tender of the amount of the legal assessments, which may be paid in annual instalments, was not required before commencing this action; and (4) that the decision in the former action is not an adjudication of the validity of the assessment in question.-Supreme Court of Kansas, 123 P. R., 874.

Streets-Regulations-Property Subject

O'Donnell v. City of Pittsburgh et al.—Act June 16, 1830, providing that streets, lanes, and alleys in the city of Pittsburgh laid out by private persons shall be demed public highways, does not apply to lands laid out as lots situated in a township and subsequently brought within the city limits.-Supreme Court of Pennsylvania, 83 A. R., 314.

Choice of Paving Material-Brand

Pollock v. Kansas City et al.-Under Section 1009, General Statutes 1909, a paving petition which used words designating one specific kind of material, patented and controlled by only one company, and furnished to bidders at only one price, in effect named the brand of material to be used, and was void.—Supreme Court of Kansas, 123 P. R., 985.

NEWS OF THE SOCIETIES

Georgia Federation of Road Authorities

The annual meeting was held at Athens, June 24-25, about two hundred members being in attendance. The program carried out was as follows:

Monday, June 24, 1912, 11 a. m.—
President W. F. Eve presiding. Welcome by Hon. J. M. Hodgson, chaircome commissioners, Clarke man road commissioners, Clarke County. Hon. Toombs DuBose, member Legislature, Clarke County. Addresses—Hon. J. F. Gray, member railroad commission, Savannah; Hon. T. E. Patterson, member prison commission, Atlanta; Hon. A. B. Blackshear, member Legislature, Richmond County, Augusta, Ga.; Hon. J. H. Merrill, Thomasville, Ga., and a representative of office of public roads, Washington, D. C. 1.30 p. m.—Lunch at Denmark Hall, at which the delegates were the guests of the citizens of Athens. 3.30 p. m.—Meeting at the University road material laboratory. Address, Prof. John C. Koch, University of Georgia. Inspection of samples. 4.30 p. m.—Delegates return to the City Hall. Address by Prof. T. P. Branch, Georgia School of Technology. Experience meeting—Informal talks by Chancellor Barrow and President K. E. Matheson. 6 p. m.—A trolley ride around the city Patterson, member prison commission, Atlanta; Hon. A. B. Blackshear, mem-Barrow and President K. E. Matheson. 6 p. m.—A trolley ride around the city by the courtesy of the Athens Electric Railway Co. 8.30 p. m.—Night meeting at the City Hall. Illustrated stereopticon lecture by Dr. S. W. McCallie, State geologist. Business meeting following lowing

lowing.
Tuesday, June 25, 1912.—Address by Prof. C. M. Strahan, University of Georgia. 9 a. m.—At City Hall. 10 a. m.—Delegates went in automobiles for an extensive ride over the county roads to Barnett Shoals Dam, the permanent convict barracks, Winterville, Elberton road, arriving at Helicon Springs in time for barbecue at 2 p. m. Returning to city at about 4 p. m. Returning to city at about 4 p. m.

Pacific Highways Association

One of the more prominent speakers One of the more prominent speakers at the annual convention of the Pacific Highway Association, to be held in San Francisco, August 5, 6 and 7, will be former Gov. J. N. Gillette, of California, who is credited with having been largely responsible for the passing of the \$18,000,000 bond issue in that State for good roads. Ex-Gov. Gillette will speak the afternoon of August 6 the afternoon of August 6.

While he has not announced his sub-ject, it will be along the line of highway improvement, in which field he has especially interested and distinguished himself. The officials of the highway association have been practically assured that Hon, Thomas Taylor, minister of public works of British Columbia, will attend and address the convention. His plans at present are to go by train to San Francisco, although he entertained at first a plan to tour south over the Pacific highway. Because of the limited time at his disposal he was forced to alter his arrangements.

National Highway Protective Society

This society, with headquarters at 46 E. 29th street, New York City, has 700 silver medals for distribution among boys who destroy signs which are illegally maintained on New York State highways. The right to remove a sign is given in chapter 316, subdivision 11, State laws of 1911. This act makes it unlawful to paint or affix any commercial adverpaint or affix any commercial adver-

tisements on any stone, tree, fence, etc., or other structure which is the prop-erty of another without first obtaining a written consent. The law further provides that any advertisements in or upon a public highway in violation of the provisions of this subdivision can be taken down or removed or destroyed

by anyone.

Col. Edward J. Cornell, secretary of the association; Frederic Martin Davies and Edwin Gould are credited with having devised this scheme.

New York State Association of Fire Chiefs

The comparative usefulness of automobile and horse-drawn fire apparatus was discussed recently at the ninth annual meeting of the association at Albany, N. Y., June 21. The majority present expressed the belief that automobile fire apparatus was a great improvement over horses. Chief Kenlon, of New York, said that gasoline should be used only in moving fire engines and that the power streams should continue that the power streams should continue

that the power streams should contain to be steam.

The following officers were elected: President, John Mack, Glens Falls; vice-president, William Bridgeford, Albany; directors, John B. Robillard, Hudson Falls, and John H. Espey, Elmira; secretary-treasurer, Henry R. Yates, Schenectady.

California Public Welfare Exposition

Under the auspices of the California Under the auspices of the California State Board of Health and the League of California Municipalities, participated in by the city council of Berkeley, the Berkeley Chamber of Commerce and the University of California, a public welfare exposition of pure foods, sanitary, safety and building appliances, including machinery and supplies used in the administration of municipal gov-ernment, will be held at the University of California, Berkeley, Cal., September 23-28.

Among the subjects of discussion and the exhibits for exploitation are the fol-

lowing:

Charters and Forms of Government The consideration of the various forms of commission and other systems of municipal government.

Non-partisan Elections for City Government—Combining of legislative and executive functions and tax-levying and tax-spending powers in one small body. Short Ballot—Abolishing ward lines and electing at large.

Municipal Accounting — Modern

Municipal Accounting — Modern methods of municipal bookkeeping. Reports and publicity giving comparisons one year with another and making

possible comparisons one city with another. Budget making.

Paving and Care of Streets—Street paving; material and manner of construction. Macadam and bituminous macadam. Oiled roads and methods of caring for natural surface roadways. Improved machinery for modern road making. Paving repairs and municipal asphalt plant. Street cleaning, showing modern equipment and organization best adapted. Street lighting, artistic modern methods adapted to cities and towns.

Parks, Playgrounds and Social Welfare-Care and beautification of parks and boulevards. Improved equipment for children's playgrounds. Public baths. Municipal employment agencies.

Health and Sanitation-Model sanitary ordinances. Sewers and sewage disposal plants. Prevention and suppression of epidemics. Garbage collection and disposal. Pure foods. Hospital appliances. Control of the rabies.

Taxation — Equalizing taxation. Method of collecting taxes. Special assessment tax. Personal property tax. Home rule in taxation. Uniform tax ordinances for small cities.

Home Rule—Restriction of city's powers of self government by State legislature. Restriction on indebtedness

Public Utilities—Control of public service companies by city and State. Indeterminate franchise. Municipal ownership. Street lighting. Water ownership. Streetens. Meters.

City Beautification—Making cities at-active and wholesome. Landscape tractive and wholesome. Landscape architecture and public buildings. Civic centers and boulevards. Tree planting and preservation.

Civic and Commercial Organizations Real assistance to a city government. Scope of their work. Things every citizen should know about his city. Relations to municipal government.

Schools-Building on scientific prinof children; mediciples. Public care cal inspection. Health more important than education. Successful methods of Kindergartens teaching. and nurseries.

Police and Fire-Police and police courts. Juvenile courts and the proba-tion system. Preventing and fighting fires. Building ordinances.

Libraries-Municipal Statistics-How a library can assist a city government. Full information may be obtained upon application to J. F. Selig, Director of Exhibits, 962-964 Pacific building, San Francisco.

Calendar of Meetings

July 8-12.

Wational Municipal League.—Annual Meeting, Los Angeles, Cal.—Clinton Rogers Woodruff, Secretary, 705 North American Building, Philadelphia, Pa.

July 10-12.

Pire Marshals' Association of Morth
America.—Annual Convention, Detroit,
Mich. Fire Marshal Palmer, Secretary, Lansing, Mich.

July 9-13.

International Association of Chiefs of Police.—Annual Convention, Toronto, Ont.—Major Richard Sylvester, Superintendent of Police, Washington, D. C., President.

August 28-30.
Virginia State Firemen's Association.
—Twenty-sixth Annual Convention and Tournament, Roanoke, Va.—L. E. Lookabill, Vice- President, Roanoke.

August 26-30.
International Association of Municipal Electricians.—Seventeenth Annual Convention, Peoria, III.—Clarence R. George, Secretary, Houston, Tex.

September 17-20.
International Association of Fire Engineers.—Annual Convention, Denver, Col.—James McFall, Secretary, Roanoke, Va.

September 18-19.

New England Water Works Association. — Thirty-first Annual Convention, Washington, D. C.—Willard Kent, Secretary.—Headquarters, Boston, Mass.

September 24-26.
Central States Water Works Association.—Sixteenth Annual Convention, Detroit, Mich.—R. P. Bricker, Secretary, Shelby, O.

Movember 12-15.

American Society of Municipal Improvements.—Annual Convention, Dallas, Tex.—A. Prescott Folwell, Secretary, 50 Union Square, New York.

PERSONALS

Bennett, Ernest H., Shade Tree Commissioner, East Orange, N. J., has resigned. Mr. Bennett will act as temporary superintendent in the absence, through physical disability of William Solotaroff.

CAMPBELL, C. D., has been appointed Town Engineer of Galt, Ont., succeeding E. O. Fuce, who will engage in private practise in Calgary, Alba.

CLARK, JAMES O., LEIGH M. PEARSALL, L. S. PHELPS, ARTHUR N. PIERSON and JOHN H. PENCHEON, Westfield, N. J., have been made members of the Play-

have been made members of the Playground Commission.

EDENS, W. G., Chicago, Ill., President of the Illinois Highway Improvement Association, gave a lunch in honor of W. Ries Jeffreys, Secretary-General of the International Roads Congress to be held in London in 1913 in London in 1913.

GRANT, KENNETH C., New York City, formerly Principal Assistant Engineer of the Pittsburgh Flood Commission, sailed for Europe July 2, to make a study of docks and river front facilities abroad for the Flood Commission and the City for the Flood Commission and the City Planning Commission of Pittsburgh. His report will serve as a basis for ac-

His report will serve as a basis for action on a bond issue.

HAYDOCK, ROBERT ROGER, Germantown, Pa., has been appointed Chief Clerk of the Highway Bureau.

KEPPING, LEWIS, Hazleton, Pa., has been appointed Fire Chief.

LANDRETH, O. H., Consulting Engineer, New York City, has been engaged to pre-

LANDRETH, O. H., Consulting Engineer,
New York City, has been engaged to prepare plans and specifications for pavements, sewerage and water works for the
Kawasaki plant of the Tokio Electric
Company, Tokio, Japan.
McMillan, John, South Pasadena,
Cal., has been appointed City Engineer.
Schultz, Henry, Ashland, O., has
been elected President of the Northwestern Ohio Firemen's Association

ern Ohio Firemen's Association.

TAYLOR, JAMES KNOX, formerly Supervising Architect U. S. Treasury Department, has received an appointment in the

ment, has received an appointment in the Department of Architecture, Massachusetts Institute of Technology.

Taylor, Leon M., Dallas, Tex., has been re-elected City Electrician, and J. M. Bassett was reappointed Chief Engineer of the Waterworks.

Walsh, Walter, Mobile, Ala., has been appointed Chief of Police to serve the unexpired term of the late Vincent A. Giblin

WONDERS, G. C., Senior Engineer United States Office of Public Roads, has gone to Brenham, Tex., to supervise road building in Washington County.

ZARTMANN, WILLIAM J., formerly Superintendent of Parks of the Borough of Brooklyn, New York City, has been appointed Principal Assistant Engineer of the Park Department of the Borough of Queens.

MUNICIPAL APPLIANCES

Addressograph
The Addressograph Co., 402 South
Peoria street, Chicago, Ill., make a machine—the Addressograph—which is
said to be used in thousands of city departments because it enables city officials with limited appropriations to secure the greatest efficiency in one imsecure the greatest efficiency in one important detail of their work. By its use an employe with little experience can print 1,000 typewritten addresses on gas, water or electric bills, envelopes, cards, checks, vouchers, receipts, ledger sheets, collectors' lists or anything, in fact, in less than half an hour. The machine is always correct and no checking is required. The value of the machine is not only in its work, but in the

THE ADDRESSOGRAPH.

fact that the plates form a card index for ready reference at any time. The plates can be arranged alphabetically, by streets, routes or districts, or in any way required.

The Addressograph is operated by foot lever or motor. The operator sits before the machine with both hands free for feeding. The matter being addressed is placed at the printing point, and by an easy swing of the foot lever, or a slight pressure of the trip if operated by motor, the typewritten impression is made. The plates are made regular, with name and address on one plate, or separate, in which a separate section of the plate carries the address. The latter is for use, of course, where addresses are frequently changed. A plate consists of three parts, the frame, the proof card and the printing plate.

In the filing cabinet the plates are filed loosely, card index fashion, in steel drawers. Followers keep the plate in upright position at all times.

in upright position at all times.

Some of the uses of this machine in the various city departments may be mentioned. In the treasurer's office, all city employe's checks, pay receipts, pay-roll sheets and other forms are Addressographed. Tax bills and accompanying bills are addressed in the same way. In the police department the machine is used to dispatch information regarding criminals rapidly to all police authorities in the list. In the department of education mailing lists are kept ment of education mailing lists are kept of teachers, employes and pupils. An illustration shows, the use of the ma-chine by a water department.

Core Drill

The Manhattan Drilling Co., 25 Broad street, New York City, manufacture the class M Dobbins core drill shown in the illustration. This machine is designed to bore holes of either large or small diameter to great depth. The three main parts, drill, hoist and engine, and direct connected and can be oneare direct connected and can be operated independently of each other. The cast iron bed plate and standards for the horizontal shafting are bolted to a low wooden base measuring 3 feet by 3 feet 6 inches. As the mechanism of the heavier parts of the drill, hoist and tne neavier parts of the drill, hoist and engine are confined below the main drive shaft, a temporary platform or foundation is unnecessary. By this arrangement the drill head is conveniently located for operation, vibration is greatly decreased and danger of breaking drill spindles and drill rods minimized.

The head of the Dobbins drill em-braces a number of important improve-ments. The drill is fitted with a swivel ments. The drill is fitted with a swivel head, so that holes may be bored at any angle up to 35 degrees from the horizontal. The drill head is hinged so that it may be swung away from the hole, thus clearing quickly for hoisting or lowering the tools. The drill spindle is square and slides freely in long sleeves on the drill head, which turns in bronze bearings. The spindle is steadied by two sleeves and long guide rods, which move vertically in the drill head. A ball bearing yoke engages the spindle at the top. The unusual length of the spindle and guide rods, permitting a feed of 30 inches, is rods, permitting a feed of 30 inches, is claimed to save time in adding drill rods, assure steadiness of the spindle and perfect alignment of the hole and prevent lashing of the drill rods and breakage of core. A ratchet lever is provided in connection with the guide rods for applying pressure when start-

| TO FLINT CITY WATER WORKS DR. | FLINT, NICH, TO FLINT CITY WATER WORKS DA. | FLINT, MICH, |
|--|--|--|
| H. E. X. YNODORDSKI, 7535 3532 GRAND BLVD. | H. E. X. YNODORDSKI, 7535 3532 GRAND BLVD. | H. B. X. YEODORDSKI, 7535 3532 GRAUD BLVD. |
| State of Meter at Date 00 ft. Per Last Bill 00 ft. Consumption 00 ft. Bit not PAID AT OUR OFFICE within Penalty By Buys breen is a date a penalty of 5 per cord will be added to this bill. Total | State of Motor at Date 00 ft. Per Last Bill 00 ft. Consumption 00 ft. Gal. @ 20 cts. per 1000 Bast PAID AT GUE OFFICE within Penalty 15 Penalty per out. with ended to his bill. Total | State of Meter at Date 00 ft. Pea Last Bill 00 ft. Consumption 00 ft. Gal. @ 20 cents 8 Penalty Tetal |

SAMPLE COPY OF WATER WORKS BILL, SHOWING USE OF ADDRESSOGRAPH.

ing the holes. By reversing the ratchet lever the pressure can be relieved when desired. The engine is of the double-cylinder, double-acting slide valve type on a separate plate, with crank shaft overhead. The working parts of the drill and hoist are below the main drive shaft. The powerful friction hoist, capable of lifting the tools up to the capacity of the drill, is direct connected to the main drive shaft. The hoist frict tion is composed of spur gears mounted in dustproof drums. A hand brake fitted with a notched segment holds the tools suspended. An automatic spring tension in connection with the hand brake allows for perfect cutting pres-sure. A feature of the machine which broadens its field of usefulness to the contractor is an arrangement whereby the drill head may be detached by removing a single bolt, thus converting the core drill into a compact and powerful hoist.

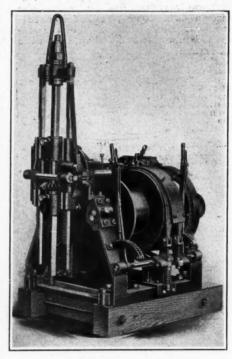
Shoveling Machine

Myers-Whaley Co., Empire building, Myers-Whaley Co., Empire building, Knoxville, Tenn., have placed on the market a shoveling and conveying machine, which they have been developing and perfecting for a number of years. Designed primarily for tunneling within mines, the machines seem applicable to a wide range of uses. The manufacturers state that the The manufacturers state that the machines can be used in almost any work of shoveling materials now done by hand, provided that a sufficient quantity is to be handled to get economical re-

Either electricity, gasoline, com-pressed air or steam may be employed for power. It is operated by one man. It is self-propelled, forward or back. It can be run on a track or on any good surface with traction wheels. The shovel will work on either a smooth or shovel will work on either a smooth or rough floor, or it will dig into the material above the floor. It will handle lumps as big as the scoop. The discharge may be at the rear or on either side. In handling materials the breakage is less than by hand shoveling. The conveyors, constitute picking tables from which material may be removed. The shoveling machine is made in sevsizes. The illustration is of a large machine, one of which was recently shipped to New York for work on the Catskill aqueduct. Its weight is 14,000 pounds; track gage, 42 inches; length, 25 feet 1 inch; width, 4 feet 9 inches; height, 4 feet 9 inches; wheel base, 41 inches; reach, 10 feet either side; width of shovel, 34 inches; power consumption, 12 h. p.; capacity, .82 cubic yards rock per minute. In actual use the ma-chine is said to average 10 to 12 cubic yards per hour.

In the construction the best obtainable materials are used and the work is carefully followed and inspected throughout the course of construction. throughout the course of construction. Practically all cast parts are steel castings, and forgings are used wherever possible. Rivet holes in frame are drilled, and then reamed in place for rivets. Frame bolts are all finished and a snug fit in reamed holes. All gears, except bronze spiral gears, are of steel with accurately cut teeth, and those with accurately cut teeth, and those gears subjected to heaviest duty are A special high carbon steel is used for gears. Gears are housed in oil tight cases whenever possible. End thrusts throughout the machine are taken by standard ball bearings. Roller bearings are used on conveyor shafts. All chains are steel. The conveyor

chain is a steel roller chain with bronze chain is a steel roller chain with bronze bushings and specially designed attachments. Drive chains are automobile type, finished nickel steel, made by Diamond Chain Co., and whenever possible are run in oil tight cases. The conveyors are a special type designed for this service. The strain is entirely taken by steel roller chains, the abrasion of material is taken by steel bars and leakage is prevented by the belt. and leakage is prevented by the belt. The chains are fastened to the sides and the bars are bolted to upper surface of the belt. The best belt obtainable for the purpose is used. The lubrication of all parts has been care-fully and efficiently provided for.



DOBBINS CORE DRILL.

Pressed steel compression grease cups are used for most bearings, with sight are used for most bearings, with sight feed oil cups for two bearings impossible to lubricate with grease. Brass and white metal linings are provided in many bearings and in all transmission boxes a special "white bronze" is used. Dust proof bearings are provided on machines to handle rock or other abrasive material.

INDUSTRIAL NEWS

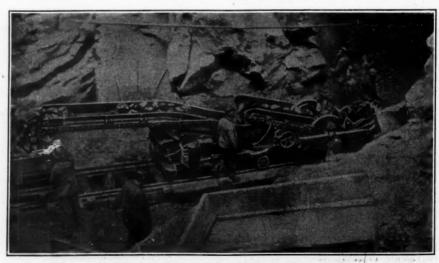
Cast Iron Pipe.—Chicago: Prices are strong and some advance seems likely to be asked in the near future. Quotations: 4-inch, \$27; 6 to 12-inch, \$25; 16-inch and up, \$24.50. Birmingham: Shipments from local plants are about at the rate of manufacture, with order books well filled for some time to come. Plants are running on full time and vards are empty. Quotations: 4 to and yards are empty. Quotations: 4 to 6-inch, \$23.50; 8 to 12-inch, \$22.50; over 12-inch, average, \$21.50. New York: Private contracting is very active, more business of this character being in process of closing than for a considerable time. The companies purchasing The companies purchasing able time. privately are buying larger quantities than for several years. If this condition of trade continues manufacturers feel confident that prices will rise.

Lead.—Market is steady. Quotations: New York, 4.50c.; St. Louis,

Steel Building Forms.—The Blaw Steel Centering Co., Pittsburgh, Pa., re-cently conducted a competition for the cently conducted a competition for the best designs for concrete residences, to cost not more than \$3,000. The prizes were awarded by A. D. F. Hamlin, of Columbia University, as follows: First prize, \$100, to E. Parmiter, 25 West 42d street, New York, N. Y.; second, \$75, to William C. Lurkey, 144 Winslow avenue, Buffalo, N. Y.; third, \$50, to J. Lehti, Apartment 103, The Eckington, Fourth and T streets, N. E., Washington, D. C.; fourth, three awards, \$25 each, to Grover Lippert, 418 West Doty street, Madison, Wis.; Everett Crab, 904 State Life building, Indianapolis, Ind., and Clyde W. Smith, 3236 Fifth avenue, South Minneapolis, Minn. The designs and specifications of the prize winners, and those of forty other contestants, will be published in a booklet. testants, will be published in a booklet.

Mexican Petroleum.—Consul Clarence A. Miller reports that the crude oil shipments from the Mexican port of Tampico to ports in the United States (including one shipment to Porto Rico) amounted to 1,118,547 barrels in the first quarter of 1912, in contrast to a total of 806,916 barrels during the entire calendar year 1911.

Power Plant Equipment. — The Brownell Co., of Dayton, O., manufacturers of high grade engines, boilers, feed water heaters, tanks, etc., will open a district office at 1418 Oliver building, Pittsburgh, Pa., in charge of B. S. Reierer, on July 1, 1912.

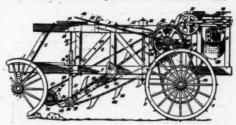


SHOVELING MACHINE FOR ROCK OR OTHER MATERIAL.

PATENT CLAIMS

1,029,359. BOCK-GATHERING AND EX CAVATING MACHINE. David A. Gil christ, Belgrade, Mont. Serial Mo

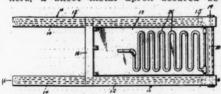
In a machine of the character specified, a frame, an endless conveyor supported by the frame, links pivoted by one end to the frame, a roller journaled in the free ends of the links and on which the front end of the conveyor is supported, arms extending forwardly from the links, a brush roller journaled between the



arms, a cross-head supporting the free ends of the links, and means for adjusting the cross-head vertically, said means comprising a swivel bar substantially parallel with the cross-head, a screw journaled in the swivel bar, and a nut on the cross-head with which the screw engages.

1,029,508. STEAM ROAD ICER. Har-leigh S. Parker, Littlefork, Minn. Se-rial Mo. 629,067.

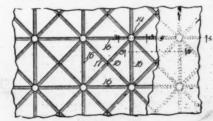
A steam road icer comprising a sleigh having hollow runners having up-turned forward ends, cross-members connecting the forward ends of the run-ners, a sheet metal apron secured be-



tween the bottom edges of the runners and having its forward end coiled around the rod, longitudinal heating pipes in the runner, a plurality of heating coils mounted between the runners and supported on the apron, said pipes and coils communicating with each other and means for supplying heat to the pipes.

1,029,575. PAVEMENT. Budolph S.
Blome and William J. Sinek, Chicago,
Ill., assignors to Rudolph S. Blome
Company, Chicago, Ill., a partnership.
Serial 30. 638,340.

A pavement including a foundation
provided with longitudinal parallel
grooves extending throughout the length
of the pavement, transverse parallel
grooves extending the entire width of the
pavement, diagonal parallel grooves extending throughout the width of the



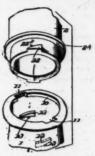
pavement and crossing the other grooves at their points of intersection, and cavities at each of the intersections of the several grooves, the walls of such cavities being vertical, and a surfacing on top of the foundation and extending into the grooves and the cavities, substantially as described.

THE LIKE. Gerard Schumacher, Anniston, Ala. Serial No. 651,670.

A hollow supporting section having a top opening surrounded by an inwardly extending flange having a vertical notch therethrough, said section provided with an internal fixed locking lug arranged a distance from and directly below said notch, in combination with an upper section having a supporting ledge and an exterior locking lug a distance below said

ledge and adapted to pass through said notch and on partial rotation of said upper section to pass and drop below said internal lug and on further rotation of said upper section to lock under said internal lug, substantially as described.

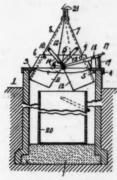
1,028,898. GARBAGE RECEPTACLE.
Louis A. Moran Grosse Pointe Farms,
Mich. Serial No. 638,253.
A receptacle having a cover, spouts
pivotally mounted in the coler to swing
together at their upper ends and close
the opening into the receptacle, said



spouts being movable upon their pivots to expose the opening through the cover and form a chute below said opening to direct refuse into the receptacle, and a removable container within said receptacle below said spouts.

1,028,949. LIQUID PUMP. Lewis Hallock Nash, South Norwalk, Conn., assignor to Nash Engineering Company, a corporation of New York. Serial No. 232,097.

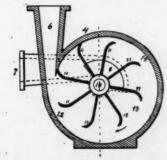
In a centrifugal pump, the combination of a casing having an outlet at its circumference, and having an inlet at its



center at the side of the center line op-posite the outlet passage, combined with an impeller wheel having blades form-ing contact with the side walls of the casing to separate the inlet and outlet ports.

1,026,994. AUTOMATIC FIRE-HOSE VALVE. Philip Mueller, Decatur, Ill., assignor to H. Mueller Mig. Co. Decatur, Ill., a corporation of Illinois. Serial No. 661,106.

In a device of the character described, a valve casing having inlet and outlet openings, and a valve seat around the inlet, a valve adapted to be moved laterally out of line with said seat, a longi-



tudinally movable member, mechanism actuated by said member to operate said valve, means on said movable member for gripping a hose nozzle, and means for disengaging said gripping means from the nozzle after the member has moved sufficiently far to fully open said valve.

Wood Preservative.-Samuel Cabot, Inc., Boston, Mass., have issued an il-lustrated booklet describing and illustrating the uses of their wood preserva-tive, Conservo. Conservo is a brownish liquid which imparts to wood a rich nut-brown shade. Anyone can apply it, using a wide, flat brush—with which the work can be done very rapidly and thoroughly—or by dipping or soaking. It is a compound of specially prepared high-boiling (non-volatile) coal tar oils high-boiling (non-volatile) coal tar oils and preservative salts, and, in addition to its preservative powers, it has strong disinfecting and germicidal qualities which destroy bacteria, worms, etc., and neutralize all putrid or noxious matter. The three cardinal principles of wood preservation are: (1) Penetrating power: to penetrate the wood; (2) permanence: to stay in the wood; (3) antiseptic power: to sterilize the wood. wood.

wood.

New Reproducing Process.—The American Map and Reproducing Company, 1262 Stark street, Portland, Ore, has patented a process for reproducing and making any number of copies of original drawings, maps, sections, idue prints, etc. After one copy has been made the copy can be used for reproduction instead of using the original. They claim the process will reproduce negative and positive prints. It is a dry process and may be effected either by day or night, absolutely without injury to the fabric or the original drawjury to the fabric or the original drawjury to the fabric or the original drawing from which the copies are made. Reproduction may be made on any kind of tracing paper or cloth, drawing paper, mounted or muslin-backed paper. The lines in the reproduction can be erased and alterations made in the same manner as the original.

Automatic Fire Alarm.—J. C. Moessner, Mt. Pleasant, S. C., has invented an automatic fire alarm which is believed to possess considerable merit. In brief, this device consists of a series of electrical instruments on the interior of a building connecting with an terior of a building connecting with an annunciator at an alarm box, and equipped with an easily melted wire, fusing at a temperature of 180 degrees, and forming a connection which registers on an annunciator of the fire alarm box, showing the street number of the residence on fire. Independent switches about a house also permit the sending in of a fire alarm direct to the box, which, under this system, will not be accessible to the public, so that no false alarm can come in from the streets. When the firemen answer an alarm, they cut the wire running to the house on fire, preventing a second alarm from coming in and this leaves the box open for other alarms. the box open for other alarms.

Concrete Cement Age.—The Concrete-Cement Age Publishing Company, 97-99 Fort street West, Detroit, Mich., and 30 Church street, New York City, announces the union of Concrete, Cement Age and Concrete Engineering under the name of Concrete-Cement Age crete-Cement Age.

Gas Producer.—An unusual form of gas producer has been invented by a German engineer, M. Ziegler, and patented by Wangemann, in which bituminous fuels, like peat, lignite, etc., are treated for manufacturing gas and coke in separate chambers side by side, one chamber used always for gas production and the other for coke making. The producer is intended for use where the demand for power on the gas engine is intermittent, while the plant may remain working at good capacity for making coke.

THE WEEK'S CONTRACT NEWS

Relating to Municipal and Public Work—Street Improvements—Paving, Road Making. Cleaning and Sprinkling—Sewerage, Water Supply and Public Lighting—Fire Equipment and Supplies—Bridges and Concrete Work—Sanitation, Garbage and Waste Disposal—Police, Parks and Miscellaneous—Proposals and Awards.

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also corrections of any errors discovered.

BIDS ASKED FOR

| STATE | CITY | RECEIVED UNTIL | NATURE OF WORK. | Address Inquiries to |
|---------------------|--------------------------|--|--|----------------------------------|
| | - | - 4 , | STREET IMPROVEMENTS | 16. |
| ennsylvania. | Freeport | July 8, 8 p.m | Constrn. 1,070 yds. hillside paving brick | G. B. Findley, Boro. Engr. |
| lew Jersey | South Orange | July 8, 7.45 p.m | Constru. 7,850 ft. bluestone walk and other work | F. J. Lovett, Chm. |
| New York | New Rochelle | July 8, 2 p.m | Constrn. bit. macadam | Joseph Walker, Comr. |
| owa | Fort Dodge | July 8, 9 a.m | Constrn. brick pav'ts in alleys | W. Tang, City Cik. |
| hic ndiana | Rochester | | | |
| labama | Livingston | July 8, 10 a.m | Constrn. macadam roads | County Comm |
| ennsylvania. | Steelton | July 8, noon | Macadam. State street. Constrn. macadam roads. Surfac. 3½ miles road with chert Imp. and paving Pine street. Constrn. stone roads; cost, \$5,100. | C P Feidt Roro Sec'v |
| ndiana | Fowler | July 8, 11 a.m | Constru stone roads: cost \$5 100 | Samuel Shipman, County Aud. |
|)hio | Wauseon | July 8. noon | Pave, with vitrified brick | L. H. Deys, Vil. Clk. |
| ew York | New York | July 8, 2 p.m | Constrn. approach to Palisades Interstate Park | C. W. Leavitt, Jr., Engr. |
| ansas | McPherson | July 8 | Constrn. brick, asphalt or concrete pav't | H. A. Rowland, Engr. |
|)hio | Youngstown | July 8, 1.30 p.m | Constrn. 21/4 miles road | F. Agnew, Sec'y Comm. |
| linnesota | St. Paul | July 8, 2 p.m | Grading a number of streets | J. J. O'Leary, Pres. Bd. Pub. W. |
| finnecoto | Shakopee | July 8, 10 a.m | Paneir Ctata good | A I Mayor County And |
| Ohio | Lowellville | fully 8 | Constru 114 miles road | W. I Maurice Township Clk. |
| owa | Marshalltown | July 8 | Constru. 7 blocks concrete pay't | W. H. Steiner, City Engr. |
| ausas | Marion | July 8 | Constru. 7 blocks paying | M. Williams, City Clk. |
| Innesota | Anoka | July 8 | Constrn. roads | A. A. Caswell, County Aud. |
| Vashington | Sumas | July 8, 5 p.m | Constrn, macadam rockmac or bituminous pav't | J. L. Mitchell, Town Clk. |
| hio | Lorain | July 9 | Constrn. wood block or other pav't | L. A. Dawes, Dir. Pub. Serv. |
| ansas | Junction City | July 9, 9 a.m | Pavg. several streets | C. K. Raber, Mayor. |
| /mio | Columbus | July 9 | Constrn. brick, asphalt or macad, pav't on several streets | S. A. Kinnear, Dir. Pub. Serv. |
| hio | Lorsin | July 9 | Pour with brief wood or asshalt | I B Johnston Cll. |
| emsylvania | Mercer | Tuly 9, HOOH | Constant 94 000 lin to asphaltic manadam | E. M. Riglow Com- |
| enneylvania | Harrishurg | Tuly 0, 10 a,m | Constru. State highway | E. M. Bigelow, Highway Come |
| alifornia | Coalinga | July 9 | Constru 9 miles road | Board Supervisors |
| labama | Red Bay | July 9, 5,80 p.m. | Constrn. 31/2 miles gravel road | County Comm. |
| hio | Cambridge | July 9, noon | Constrn. 12,250 yds. vit. block paving | K. M. Cosgrove, Chief Engr. |
| labama | Wetumpka | July 9, noon | Imp, and paving Pine street. Constrn. stone roads; cost, \$5,100. Pawg. with vitrified brick. Constrn. approach to Palisades Interstate Park. Constrn. brick, asphalt or concrete pav't. Constrn. 2½ miles road. Grading a number of streets. Constrn. 2 miles gravel road. Repair. State road. Constrn. 1½ miles road. Constrn. 7 blocks concrete pav't. Constrn. 7 blocks paving. Constrn. 7 blocks paving. Constrn. roads. Constrn. macadam rockmac or bituminous pav't. Constrn. wood block or other pav't. Pavg. several streets. Constrn. brick, asphalt or macad, pav't on several streets. Constrn. 18 miles road. Pavg. with brick, wood or asphalt. Constrn. 24,000 lin. ft. asphaltic macadam. Constrn. State highway. Constrn. State highway. Constrn. 3½ miles gravel road. Constrn. 4 miles gravel road. Constrn. 4 miles gravel road. Constrn. 4 miles gravel road. Constrn. 700 cu, yds. macadam. | County Comm. |
| alifornia | Fresno | July 9, 10 a.m | Constrn. road | D. N. Barnwell, Clk. |
| Visconsin | Jamestown | July 10 | Constrn. 700 cu, yds. macadam | F. H. Lenstra, Com. Superv. |
| ew Jersey | Linden | July 10, 8 p.m | Constrn. 700 cu, yds. macadam. Constrn. 700 cu, yds. macadam. Constrn. 35 miles road. Constrn. 21,000 yds. brick and 3,100 cement pav't. Constrn. 4,500 ft. cement gutter; 50 basins. | J. Ross, Dist. Clk. |
| ennessee | Crossville | July 10, 8 p.m | Constru. 30 miles road | J. F. Custman City Frage |
| ansas lew Jersey | Paterson | July 10, 8, p.m | Constru. 21,000 yds. Brick and 3,100 cement pav t | Paterson Park Comm |
| diana | Delphi | Tuly 10, 4.50 p.m | Constru. 4,000 It. cement gutter, ou basins | G W Baxter And |
| Vashington | Monroe | Tuly 10, 10 a.m. | Constru standard hard surface nav't | W. H. Clark, Town Clk. |
| labama | Mobile | July 11 poon | Constru. 10 miles of road | C. L. Strange, Engr. |
| hio | Toledo | July 11 | Repairing roads | C. J. Sanzenbacher, County Aud. |
| Visconsin | Janesville | July 11, 2 p.m | Pavg. alley with brick | J. A. Fathers, Chm. Bd. Pub. W |
| ansas | Leavenworth | July 11, 5 p.m July 12, 10.30 a.m July 12, 2 p.m | Constrn. 4,500 ft. cement gutter; 50 basins. Constrn. gravel roads. Constrn. standard hard surface pav't. Constrn. 10 miles of road. Repairing roads. Pavg. alley with brick. Constrn. curbing and grading. Pavg. with bit. concrete or other pav't. Constrn. asphalt and bit. macadam pav't. | J. H. Kirmeyer, City Cik. |
| lew Jersey | Passaic | July 12, 10.30 a.m | Pavg. with bit. concrete or other pav't | City Clerk, |
| | | July 12, 2 p.m | Constrn, asphalt and bit. macadam pav't | Commissioners. |
| Ohio | Cincinnati | July 12, noon | Oil, roads | Fred Houshoon County And |
| ndiana | LaPorte | July 12 | Constru brick hitum concrete and applied on 16 streets | H R Salter City Clk |
| Wisconsin | Edgerton | July 12 | Construe ashhalt macadam nav't | H. B. Knapp. City Clk. |
| llinois | Monticello | July 13 | Constru. 5.600 vds. brick pay't | W. Britton, Clk. |
| ndiana | Goshen | July 15, 1.80 p.m | Macad. highway | J. W. Brown, County Aud. |
| entucky | Pikeville | July 15 | Constrn. 15,000 yds. brick pav't | A. S. Reese, Clk. |
| daho | Idaho Falls | July 15 | Constrn. 36,000 yds. bitulithic pav't | Frank Beach, Engr. |
| ennsylvania. | Marcus Hook | July 15, 8 p.m | Constrn. 10,600 yds. bit. pav't | C. H. Casey, Chm. Comm. |
| ndiana | Madison | July 15 | Constru gravel and crushed stone road | A. I. Smith, County Surv. |
| ew Jersey | Roselle Park | July 15, 8 p.m | Constrn. 14,000 yds. bituminous macadam | A. M. Woodruff, Boro, Clk. |
| ew Jersey | Camden | July 15, 8 p.m | Pavg. with Belgian blocks and brick | J. C. Haines, Chm. |
| linois | Cairo | July 16, 7.45 p.m | Payer number of roads | R I Cunningham County Come |
| ennsylvania. | Pittsburgh Bloomfield | July 16, 10 a.m | Constru 44 000 vds brick asphaltic concrete or coment pay't | A B Welch City Clk |
| Vashington | Kirkland | July 16, 8 p.m July 17 | Oil, roads. Constrn. 3 miles gravel ¼-mile concrete road. Constrn. brick, bitum, concrete and asphalt on 16 streets. Constrn. asphalt macadam pav't. Constrn. 5,600 yds. brick pav't. Macad, highway. Constrn. 15,000 yds. brick pav't. Constrn. 36,000 yds. bitulithic pav't. Constrn. 10,600 yds. bitulithic pav't. Constrn gravel and crushed stone road. Constrn. 14,000 yds. bituminous macadam. Pavg. with Belgian blocks and brick. Furn. gravel roads. Pavg. number of roads. Constrn. 44,000 yds. brick, asphaltic concrete or cement pav't Grad. New Hampshire avenue. | City Clerk. |
| | | | | |
| labama | Elba | July 19, noon | Constrn. 2,100 yds. pav't. Pavg. with vit. brick 8 streets and alleys. Constrn. 1,250 yds. concrete pav't. | County Commissioners. |
| Visconsin | Racine | July 20 | Constrn. 2,100 yds. pav't | P. H. Connolly, City Engr. |
| est Virginia. | Huntington | July 22, noon | Pavg. with vit. brick 8 streets and alleys | L. A. Pollock, Street Comr. |
| owa | Clinton | July 23, 8 p.m | Constru. 1,250 yds. concrete pav't | R. C. Hart, City Engr. |
| anada | N. Toronto, Ont. | July 30, noon | Constru. Tarvia on 5 streets, asphalt, asphaltic concrete or other pav't on 8 streets | |
| | | | SEWERAGE | z., ri. james, Eligi. |
| ennsylvania. | Reading | Tuly 7 | Constrn. vit. pipe storm sewers | E. B. Ulrich City Engr. |
| lhio | Voungetown | Indy & | Constru sewers in several streets | W H McMillin Clk |
| anada | Weston, Ont | July 8, noon | Constrn. 9 miles 6 to 8-in. pipe sewers and 4,300 ft. 36-in. | |
| | - | | concrete sewer | R. J. Bull, Reeve. |
| ndiana | Thorntown, | July 8, 2 p.m | Constrn, 8 sanitary sewers | F. E. Clark, Pres. Trustees. |
| onnecticut | Plartford | July 8 | Constant tile courses on coursel streets | P. O. Woodsuff Chm. Dd. Dt. W. |
| iicnigan | Climton | July 8, 9 a.m. | Construction 1 400 ft 10 to 15 in alex pine sever | C I Reusche City Clb |
| lifornia | Los Angeles | Inly 8 | Constru storm water drain | H G Lelande County Clk |
| anada | Estevan, Sask | Tuly 9 | Constrn. outfall sewer, disposal works and numning plant | L. A. Duncan, Sec'y-Treas. |
| hio. | Columbus | July 9 | Constrn. sewers | Board Public Service. |
| ashington | Renton | July 9, 7,30 p.m. | Constrn. lateral sewers: cost. \$5.000. | A. W. Ticknor, City Clk. |
| anada | Carolton Place | July 9, noon | Constrn. 5 miles of sewers and water mains | Sewer and Water Comm. |
| ndiana | Kokomo | July 9 | Constrn. 6-ft. concrete sewer; cost, \$35,000 | B. Havens, Clk, Bd, Pub, Wks. |
| linnesota | Morris | July 9 | Constrn. 3,000 ft. 8-in. sewer | C. B. Burpee, City Clk. |
| ennessee | Crossville | July 10, 3 p.m | Constrn. 1,800 ft. corrugated pipe and 4,000 ft. vit. pipe | County Highway Comm. |
| lassachusetts. | New Bedford | July 10, 4 p.m., | Furn. piping valves, etc., for pumping station | W. F. Williams, City Engr. |
| cxas | Clarksville | July 10 | Constrn. 9 miles 6 to 8-in. pipe sewers and 4,300 ft. 36-in. concrete sewer. Constrn. 8 sanitary sewers. Install. pumping equipment. Constrn. 1,400 ft. 10 to 15-in. clay pipe sewer. Constrn. outfall sewer, disposal works and pumping plant. Constrn. outfall sewer, disposal works and pumping plant. Constrn. lateral sewers: cost, \$5,000. Constrn. 5 miles of sewers and water mains. Constrn. 6-ft. concrete sewer; cost, \$85,000. Constrn. 3,000 ft. 8-in. sewer. Constrn. 1,800 ft. corrugated pipe and 4,000 ft. vit. pipe. Furn. piping valves, etc., for pumping station. Constrn. sewers; cost, \$25,000. Constrn. sewers; cost, \$25,000. Constrn. brick and pipe sewers in number of streets. Constrn. 14,000 ft. sewers. | A F Change D |
| | | | | O C SIPPLE MOTO PIES |
| ew rork | Owkalacca | July 10, 11 a.m | Constru sanitary sewers | S V Paynolds Mayor |

BIDS ASKED FOR

| STATE | Citt | RECEIVED UNTIL | NATURE OF WORK | Assauss Inquinins re |
|---|--|---|--|--|
| Alabama Massachusetts Canada Kansas Canada New Jersey Minnesota Ohio North Carolina Indiana North Carolina Iowa Texas Kansas California | Mobile. Fitchburg. Prince Albert. McPherson. Watrous, Sask. Westfield Thief River Falls East Youngstown Carthage. Shelbyville. Carthage. Burlington Dallas. Independence. Sausalito. | July 11, noon. july 12, noon. July 12, noon. July 18 July 16 July 16 July 16 July 16 July 16 July 16, 5 p.m July 16, 2 p.m July 24 July 30 Aug. 1 | Constrn. drain pipe Constrn. 3,245 it. 36-in, concrete sewer, etc. Furn. electrically driven centrifugal pumps. Constrn. 634 miles 8 to 15-in, sanitary sewers. Constrn. sewers and water works. Constrn. 2,700 ft. 8 to 10-in. clay pipe sewer. Constrn. 6,900 ft. 4 to 12-in. sewer pipe, etc. Constrn. sewers in several streets. Constrn. sewage system and water works. Constrn. sewage pumping station. Constrn. sewage pumping station. Constrn. sewers and water works. Constrn. sewers system; cost, \$50,000. | C. L. Strange, County Engr. D. A. Hartweil, Chief Engr. C. O. Davidson, City CR. A. K. Rowlan, City Engr. Jos. Gaye, Sec'y-1 reas. A. W. Vars, Town Engr. W. H. Quist, City Clk. P. J. Carney, Clk. W. B. Jennings, Sec'y. L. E. Webb, City Clk. W. G. Jennings, Sec'y. H. G. Vollmer, City Engr. City Commissioners. A. H. Krienhagen, City Clk. H. W. Chadwell, Town Engr. |
| | | | WATER SUPPLY | |
| Dist. Columbia New Jersey Louisiana California Ohio | Washington South Orange New Orleans Orange Oberlin | July 8, 2 p.m July 8, 8 p.m July 8, 8 p.m July 8, 3 p.m July 8 July 8 | Furn. 185 tons c. i. pipé specials Constrn. gate house; also turn. 4,650 ft. 12-in. c. i. pipe, etc. Furn. sluce gates Constrn. 9,000 ft. 6 and 8-in. water pipe Constrn. water softening plant; cost, \$40,000 | Commissioners. M. A. Fitzimmons, Vil. Clk. F. S. Shields, Sec. Sew. & Wat. Bd. C. W. Hallman, City Clk. W. F. Schickler, Supt.; A. E. Kimberly. Engr., Columbus O. |
| Minnesota Ohio Virginia. Canada Texas. Kansas. Ohio | Warren Sandusky Akron Culpeper High River, Alta Dallas Independence Fortsmouth | July 8, 8 p.m July 10 July 10 July 12, noon July 18, noon July 17, 2 p.m July 18, 2 p.m July 18 | Extend. water mains. Constrn. 4 filters and 2 sedimentation basins, drilling well. Constrn. water mains; 3 contracts. Constrn. filtration plant; capacity, 1,000,000 gal. per day Constrn. pump house, machinery, well ejector and disp wks. Constrn. purification plant. Constrn. 4,000,000-gal. pumping engine. Constrn. pumping station, well, intake, reservoir, filtration plant and pumping machinery. | N. N. Powell, City Recorder. R. L. J. Wagner, City Engr. R. M. Pillmore, Dir. Pub. Serv. E. E. Johnson, City Attorney. G. E. Mack, Sec'y-Treas, J. B. Winslett, City Sec'y. G. H. Krienhagen, City Cik. J. M. Williams, Dir. Pub. Serv. |
| Texas Minnesota Spain | Dallas Duluth Madrid | July 24 (about) July 27, 4 p.m | valves, hydrants, tanks, filters, boilers, pumps, engines, electrical equipment. Constrn. water hitration plant. Furn. spiral united steel pipe and specials. Constrn. filtration and purification plant. Constrn. reinforced concrete siphon. | D. McTavish, Sec'y-Treas. Commissioners. L. N. Case, Mgr. Canal Commission. |
| | | | LIGHTING AND POWER | 4 |
| Dist. Columbia Minnesota Ohio Nebraska Canada | Washington Wabasha Wilmington Wahoo Battleford, Sk | July 8, 10,30 a.m July 8 July 9, noon July 9, noon July 10, noon | Furn, elec. equipment for hydro-electric station at Gutan Furn. boiler Light. streets, alleys and public grounds Imp. and extending lighting system Constrn. power house, generators, switchboard, pump, mo- | Major F. C. Boggs. D. J. Ginther, County Aud. F. Babb, Vil. Clk. C. L. Mielance, Mayor. |
| Indiana | Kendallville | Tuly 10 | Furn, equipment for elect light plant | Lity Clk: E. H. brochich wash |
| Illinois Washington | Chicago Spokane | July 11, noon July 16, 2 p.m | Furn. tungsten lamps, globes, cables, post heads, windlasses Install. 94 electroliers and maintaining same | Bldg., Toledo, O., Consult. Engr. Saritary District. Comr. Fassett. |
| | • | | PIRE EQUIPMENT | |
| Ohio | Youngstown | July 9, noon | Furn. tractor for water tower, motor-raised hook and ladder truck, 2 chiefs' care, 6 runabouts. Furn. 4 hose & pump auto. fire eagines, 3 comb. hose & chem. auto. engines, 4 tractors for steam fire engine, tractor for aerial truck, tractor for service truck, tractor | Herman Loeb, Dir. Dept. Supplies, |
| Ohio | Canton | July 18, noon July 16, noon | for heavy hose & chem. wagon Bldg. fire station. Install, sig. system for fire & police depts., 30 bxs. & cen. sta. Furn. motor-driven aerial truck, 2 motor chem. engines, hose wagons & fire. engines comb., 2 motor comb. chem. & hose wagons, 1 motor comb. squad chem. & hose wagon and | J. H. Brown, Dir. Pub. Salety. |
| Ohio Pennsylvania. | E. Youngstown Sharon | July 22, noon Aug. 6, noon | 1 chief's car. Furn. combination chemical and hose wagon. Furn. automobile fire engine. | P. J. Carney, Vil. Clk. O. J. Denny, Boro. Sec'y. |
| 1 | | | BRIDGES | |
| Minnesota New Jersey South Carolina West Virginia. Minnesota | Bimidji | July 10, 3.50 p.m july 10, noon July 11 july 13, 3 p.m | Constrn. concrete bridge. Constrn. steel and concrete bridge. Constrn. 2 concrete bridges. Constrn. bridge. Constrn. bridge. Constrn. highway bridge, 283 ft. long, 3-span 16-ft. roadway, | J. L. George, County Aud. J. L. Bauer, County Engr. County Commissioners, County Clerk, L. A. Frickson, Chm. Comm. |
| Indiana Illinois Ohio Indiana | Muncie | July 17, 1,30 p,m July 20 July 20, 11 a.m July 22 | Constrn. highway bridge, 283 ft. long, 3-span 16-ft. roadway, floor 20 ft. above river. Constrn. 6 bridges. Constrn. concrete bridge. Constrn. bridge work. Constrn. 2 concrete bridges. | F. M. Williams, County Aud. W. M. Huffman, Town Clk. J. F. Goldenbogen, County Clk. C. A. Baldwin, City Clk. |
| vot - | | | MISCELLANEOUS | |
| New Jersey New York | New Rochdelle | July 8, noon | Bldg. Boro, Hall. Bldg. library building. Furn. road roller and scarifier Constrn. river improvements Constrn. town hall. Furn. reversible road grader Constrn. retaining wall, etc. Making surveys and drawing map of city Constrn. 3 comfort stations. Furn. five 1½-ton chassis for patrol wagons. Furn. 1,000 sign plates and sign posts Furn. 4 single-cylinder motorcycles. | City Clerk, |
| New Jersey Dist. Columbia Dist. Columbia | | | | |
| New York Ohio Texas Alabama Indiana Pennsylvania. | Marion | July 16, 7.30 p.m | Constrn, retaining wall. Constrn, ice-making and refrigerating plant. Furn. tanks for oil and gasoline storage. Constrn. city hall; cost, \$400,000. Furn. 28,000 bulbs and plants. Install. refrigeration system in market house. Constrn, jail. Bidg. market and city hall. Furn. machinery for manual training school. Furn. one 40-ton & one 10-ton elecoperated traveling crane. | F. R. Heck, City Clerk. F. Roland, Ir., Sec'v. |

STREET IMPROVEMENTS

Los Angeles, Cal.—Petitions have been received asking for improvements to various streets

Sacramento, Cal.—Trustees have or-dered improvement of K st., from 17th to 20th started on grade to be established by City Engineer. Pacific Gas & Electric Co., city, and Western Pacific are to share

in cost.

San Mateo, Cal.—Board of Supervisors and representatives from various civic bodies of San Mateo County are discussing the proposed expenditure of \$1,250,000 for good roads. Should the county fathers decide that people desire expenditure of that sum special election will be called. According to law, county cannot bond itself for more than \$1,250,000 for roads.

Washington, D. C.—Rockville pike, from District line to Rockville, Md., will be repaired and put in first-class condition at cost of \$30,000.

East Moline, III.—Resolutions have been passed providing for paving of Second ave., from First st. to Seventh st., with asphalt; cost, \$36,430.

E. St. Louis, III.—Improvement of State st., from 34th to 39th sts., is being considered.

East St. Louis, Ill.—Council passed ordinance, at suggestion of Board of Local Improvements, authorizing improvement of Waverly ave., from 40th st. to Vandalia ave., one block. Improvement is to cost \$5,000, and include sewers and paving

morris, Ill.—Bids will soon be received by Board of Local Improvements for improvements of Jackson and North sts. with concrete base and asphaltic cement pavement. F. D. Condon, Clerk of Board of Local Improvements.

Board of Public Works

Evansville, Ind.—Board of Public Works as approved of construction of 14 side-

walks.

Indianapolis, Ind.—Property owners of Eddy st. have petitioned Board of Public Works to pave street from Norwood st. to Pogues run. City Engineer Klausmann has been asked by board to prepare plans for work.

Jackson, Ind.—Citizens are circulating two petitions to improve pike through Dublin, Centerville, Cambridge City and East Germantown.

Des Moines, Ia.—Council has authorized paving of Fourth st., from Euclid ave. to Boston st.

Dos Moines, Is.—Superintendent of Streets has prepared ordinance to City Council calling for paving of West 32d st., from Woodland to Center sts.

Boston, Mass.—Order of Board of Street Commissioners providing for extension of Arlington st., from Boylston to Columbus ave., has been signed by Mayor Fitz-gerald. Cost of improvement as estimated by Board of Street Commissioners is \$629,805.58.

***Ealamazoo, Mich.—As soon as bond for \$281,000 issue have been signed by Mayor, work on various public improvements will

work on various public improvements will be commenced.

Saginaw, Mich.—Estimates have been received for paving of Niagara st., Court to Ames, \$5,639.75; Ames to Madison, repaving, \$2,062.50; Madison to Clinton, \$4,109.50; also for paving of alley in block 9, Janes to Thompson, \$1,776.75; and alley north of Cass, Michigan to Hamilton, \$694.65

\$694.65.

Duluth, Minn.—Residents in portion of city affected are signing petitions to grade Seventh st., from Fourth ave. west to 14th avenue east.

Minneapolis. Minn.—Council has ordered Richfield rd. paved; also widening of Third ave., at cost of about \$108.788.

Rochester, Minn.—Plans are being prepared for paving of Fifth st.

Bochester, Minn.—Plans are being prepared for paving of Fifth st.

St. Paul, Minn.—Sixteen miles of concrete road, longest strip of that kind of construction in State, will be built in Winona County, first county to take advantage of Elwell law. Bids received for macadam roadway will be rejected and specifications prepared for bidders on concrete road. Specifications will provide for travel track eight feet wide in center of road with crushed stone or gravel on sides for turnouts. Six inches of concrete will form center. Approximate cost of 16 miles of concrete roadway is \$120,000. Business men and farmers of Winona County have already subscribed \$31,000 as first assessment. Under provisions of Elwell act State will pay \$60,000, county \$30,000 and benefitted land owners remaining \$30,000.

Winona, Minn.—County will construct 16 miles of concrete road; cost, \$120,000. Camden, M. J.—Ordinance has been passed directing improvement of Second st., from Federal st. to Mechanic st., by

paving with Belgian blocks on 4-in. concrete foundation. Jas. E. Hewitt, President of City Council.

Collingswood, N. J.—Council has directed paving of Clinton ave. with machine

Elizabeth, N. J.—Ordinances have assed for improvement of va

Ocean City, W. J.—City Commissioners. have just passed ordinance to issue additional bonds to amount of \$114,000, of which \$69,000 will be used for street im-

which \$69,000 will be used for street improvements.

Perth Amboy, M. J.—Resolutions have been passed by Board of Aldermen to introduce on July 1 ordinances providing for paving of Mechanic st., between Fayette and Washington sts., and establishment of grade on Johnstone st., between Hall and Eagle aves.

Boselle, M. J.—Borough Council has ordered improvement of Third ave.

Somers Point, M. J.—Notice is hereby given that Finance Committee of Common Council and City Solicitor by direction of Common Council will offer at public auction, bonds of city of Somers Point, in sum of \$35,000, at office of E. A. Higbee, Union National Bank Bidg., Kentucky and Atlantic aves., Atlantic City, N. J., proceeds to be used for improving certain streets.

Trenton, N. J.—Indications are that half mile of Pennington ave., from old city line near Heil residence to Prospect st., will soon be paved with asphalt at expense of county.

Wildwood, N. J.—Sidewalks, curbs and sewer on Baker ave. will be extended 200 ft. oceanward.

wildwood, N. J.—Sidewarks, curvs and sewer on Baker ave, will be extended 200 ft. oceanward.

Brooklyn, M. Y.—Another batch of 95 paving resolutions that were held up by new paving law will be brought before local boards of following districts for action: New Lots, Flatbush, Bay Ridge-Flatbush, Bay Ridge and Williamsburg.

Mt. Vernon, M. Y.—Common Council of city of Mount Vernon, N. Y., will on the 2d day of July, at 8 o'clock, p.m., receive sealed proposals for the purchase of \$5,000 worth of bonds to be denominated "Highway Repaving Bonds." Peter Collins, City Clerk.

New York City, M. Y.—Plans are being prepared for parkway boulevard which is to run through Borough of Queens, connecting both Manhattan and Brooklyn with Long Island Motor Parkway at Success Lake.

Poughkeepsie, M. Y.—Board of Public

Poughkeepsie, N. Y.—Board of Public Works is considering extension of Man-

works is considering extension of Mainsion st.

Syracuse, N. Y.—Board of Supervisors has approved plans for construction of about 23 miles of new roads in county. There are seven roads in all, total cost being \$398,200. Of this amount State will pay \$254,499 and county will pay remainder. Advertising for bids will commence within two weeks. With new allotment of 23 miles, Onondaga will have under construction nearly 80 miles of new roads. Total cost will reach \$1.200,000. Seven roads to be built now are: Syracuse-Scuth Bay-Bridgeport, Manlius Center-Manlius-Onondaga Valley, Ambertisco, Niles-Mandana, Vesper-Tully and Eastwood Village-Burnet ave. in town of Dewitt.

Dayton, O.—Since it has been discov-

Dewitt.

Dayton, O.—Since it has been discovered that low bid on Forest ave. paving contract is regular, it appears foregone conclusion that work will be awarded to David Beard, whose bid on creosoted wood block, longleaf yellow pine, on that part of thoroughfare, between Rung and Main sts., was \$21,582, and on that portion between Lehman and Rung st. is \$21,803.50.

Dayton, O.—Hayden, Miller & Co., of Cleveland, has secured \$45,000 street repair bonds, \$25,000 water works extension (Dayton View and Riverdale standpipes) and \$2,500 asphalt repair plant bonds.

Pindlay, O.—Davies-Bertram Co., of Cincinnati, has been awarded \$53,000 bond issue to be used in building stone roads, and Tollotson & Wolcott, of Cleveland, \$4,000 bond issue. The \$57,000 will construct about 18 miles of improved roads.

Girard, O.—Bids will be received until 2 noon, July 22, for purchase of \$24,500 bonds for improvement of State st. Jas. E. Stotler, Clerk of Village.

Lisbon, O.—Nineteen thousand dollars worth of bonds for improvement of Liverpool Lisbon rd. out of East Liverpool have been sold to Seasongood & Mayer, ot Cincinnati.

Cincinnati.

Springfield, O.—Improvement resolutions have been adopted, providing for grading and graveling of first alley east of Glenn ave., from High to Mound sts.

Allentown, Pa.—Councils have awarded contract for more than two miles of paving for asphalt at \$1.76 a sq. yd. Amesite was offered at \$1.79 and brick at

\$2.45. This will give Allentown more than 25 miles of asphalted streets.

Altoons, Pa.—Electors have authorized increase in bonded debt of city in sum of \$150,000, \$50,000 of which will be for resurfacing five paved streets.

Coatesville, Pa.—Council has negotiated loan for \$25,000, to be used for street and water purposes.

Brie, Pa.—Bids have been rejected for paving of Cherry st. J. & M. Doyle were lowest bidders on Class B asphalt pavement on Cherry st., between 18th and 19th sts., at \$1.55, and on brick at \$1.65 a yd. Mayer Bros. Construction Co. bid \$1.60 on asphalt and \$1.66 on brick. John Mc-Cormick & Son bid \$1.58 on asphalt and \$1.66 on brick. John Mc-Cormick & Son bid \$1.58 on asphalt and \$1.66 on brick.

Harrisburg, Pa.—Contracts for construction of over 203,800 feet of improved highway will be let in latter part of July by State Highway Commissioner E. M. Bigelow, and it is possible that another list of contracts may be offered before August begins. Details of estimates for improving number of sections of main highway routes are now in hands of engineers of department.

Parrell, Pa.—At special meeting of Council finance committee passed ordinance providing for \$50,000 bond issue election. Of this amount \$30,000 will go towards necessary street improvements.

Philadelphia, Pa.—Bids received in Department of Public Works for repairs to county roads were said to be far in excess of prices paid in other cities for such work. There is total of \$254,000 for these repairs, including maintenance of drains and sprinkling of roads. There were number of bids at unit prices, and until these are reduced to totals actual low bidders will be about \$150,000. Roads to be repaired will cover area of about 75 miles and includes repair of macadam section and their covering with bituminous or oil binder.

Williamsport, Pa.—There is movement on foot to macadamize road leading to Williamsport, Pa.—Edds for paving of washington st., from Railroad to Almond st.

Williamsport, Pa.—Edds for paving of washington st., from Rai

Almond st.

Providence, R. I.—Board of Aldermen has authorized hiring of \$60,000 for widening and repaving of Plainfield st., from Olneyville sq. to Pocasset ave.

Chattanooga, Tenn.—Paving of East End ave., from McCallie ave. to 11th st. is being considered.

Abilene, Tex.—At regular meeting of City Commissioners election for issuing \$30,000 street improvement bonds was ordered for July 29. If passed, this issue will be used to connect paved streets with paved county roads, which only come up to city limits:

Dallas, Tex.—Petition has been authorized.

city limits:

Dallas, Tex.—Petition has been reived asking for paving of McKinney

ave.

Sherman, Tex.—Sherman City Council has called election for July 25 to see whether or not bonds in sum of \$198,000 for public improvement purposes shall be issued. Bonds are to be divided between street paving, sewerage extension, enlargement of the fire department and water extension.

Lynchburg, Va.—Appropriation of \$4.150 has been made for construction of macadamized road from point on Rivermont ave. just beyond Rivermont Park to connect with Forest rd. near Murrell estate.

Aberdeen. Wash.—The Second District, in which Aberdeen is located, will receive biggest part of expenditures of three county districts in event of \$250,000 road bond issue which commissioners purpose to place before the voters at general election carries. Apportionment as planned will allow \$75,000 for First District, \$95,000 for 2d District and \$80,000 for 3d District. In Second District \$40,000 would be spent on South Side rd. Graveling for Cosmopolis-Melbourne road is figured at \$13,000, and appropriation of \$30,000 is asked for Cosmopolis-North River rd. Expenditure of \$12,000 is called for on road from the Frye ranch to Aberdeen, commonly known as A. J. West rd. Quiniault district will receive chief benefit in Third district, \$30,000 being asked for roads there and \$26,000 for East Hoquiam rd. Each of these thoroughfare will open up fine agricultural country and give ranchers access to market. Expenditures of \$10,000 each will be made on C. D. Hansen rd and Aloha rds. in same district, according to plans of commissioners. Four thousand dollars will be spent on Grass Creek rd. The \$75,000 it is proposed to spend in First District will be divided over 32 roads, of which Garrard Creek and Sine rds. will receive \$12,000 and \$10,000, respectively.

Spokane, Wash.—Plans for paving of the contract of t

Spokane, Wash.—Plans for paving of Main ave., from Division st. east to Northern Pacific right of way, have been submitted to City Council for approval; cost, \$9,300 to \$14,000. Estimates on various pavings for Main ave. are as follows: Asphalt, \$9,800; brick, \$17,052; bitumass, \$9,200; bitulithic, \$13,034; concrete, \$11,173; granitoid, \$12,250; Hasam, \$11,408.

Spokane bituminous, \$9,004; wood block, \$14,308.

Charleston, W. Va.—Resolution has been adopted declaring it necessary to improve Thompson st., from Washington st. to first alley north of Dixie st., by paving.

Janesville, Wis.—Board of Public Works is receiving bids for 675 sq. yds. brick paving, 131 lin. ft. of brick protection curb and 596 cu. yds. excavation.

Milwankee, Wis.—As soon as plans and specifications are completed, bids will be entered for work on Watertown, Mukwonago and Kilbourn rds. Watertown rd. will be paved with either brick or sandstone. Three additional miles of Kilbourn rd. will be paved with concrete and same material will be used on Mukwonago rd. Two miles of road near Granville will be paved with macadam.

Yorkville, Wis.—Fund of \$1,582 has ben raised for improvement of highways and bridges.

CONTRACTS AWARDED

Birmingham, Ala.—To Standard Oil Co., contract to furnish oil for Fifth and Walnut sts. Ordinance for oiling Forest ave. was passed.

contract to furnish oil for Fifth and Walnut sts. Ordinance for oiling Forest ave. was passed.

Birmingham, Ala.—For completing unfinished brick pavement on Third and Chestnut sts. to C. O. Duncan, of this city. With bid of \$1.90 per sq. yd. and \$50 additional, Duncan was lowest of three applicants for contract.

Little Bock, Ark.—By Trustees of Street Improvement District No. 186, to Rackliffe Gibson & Dillingham, for paving W. 23d st. with wood blocks, on 5-in. concrete foundation.

Burbank, Cal.—By City Council, to Janet Cement Co., of Glendale, for construction of cement sidewalks and curbs on Second, Olive and Angeleno aves.

Los Angeles, Cal.—By Board of Public Works, for following improvements: Commonwealth ave., from Temple to Melrose, to W. F. Hewitt Co., Inc., at \$2.30 a lin. ft. for grading and graveling; 33 cts. a lin. ft. for grading and graveling; 35 cts. a lin. ft. for cement curb; 15 cts. a sq. ft. for sidewalk; \$493.60 for storm drains: aggregate, \$12.882.07. Lemoyne st., from Montana to Sunset, to A. L. McCray, at \$3.45 a lin. ft. for granite block gutter; 11 cts. a sq. ft. for granite block gutter; 12 cts. a sq. ft. for granite block gutter; 13 cts. a sq. ft. for granite block gutter; 16 cts. a sq. ft. for granite block gutter; 16 cts. a sq. ft. for granite block gutter; 16 cts. a sq. ft. for granite block gutter; 16 cts. a sq. ft. for granite block gutter; 16 cts. a sq. ft. for granite block gutter; 16 cts. a sq. ft. for granite block gutter; 16 cts. a sq. ft. for granite block gutter; 16 cts. a sq. ft. for granite block gutter; 16 cts. a sq. ft. for granite block gutter; 18 cts. a sq. ft. for granite block gutter; 18 cts. a sq. ft. for granite block gutter; 18 cts. a sq. ft. for granite block gutter; 18 cts. a sq. ft. for granite block gutter; 18 cts. a sq. ft. for granite block gutter; 18 cts. a sq. ft. for granite block gutter; 18 cts. a sq. ft. for granite block gutter; 18 cts. a sq. ft. for granite block gutter; 18 cts. a sq. ft. for granite block gutter; 18 cts. a sq. ft. for granite b

sq. yd.

Pocatello, Idaho—To Strange & Maguire, of Salt Lake City, Utah, for paving with bitulithic 20 blocks in business section of city, for \$86,635.

Decatur, III.—For paving E. North st., to S. A. Tuttle, of Decatur, for \$27,793, and for paving Cleveland ave., to Lisle Hunt for \$14,188

to S. A. Tuttle, and for paving Hunt, for \$14,188.

Hunt, for \$14,188.

Grante City, III.—By Board of Local Improvement, for paving C st, and Pacific ave., as follows: C st., to Granite City Lime & Cement Co., of Granite City, as follows: 10,100 sq. yds. creosoted wood block paving, \$2.54; 7,010 lin. ft. combination curb and gutter, 94 cts.; 7,488 lin. ft pitch expansion joint, 5 cts.; 32 sq. yds. concrete header, \$1.90; 12,350 sq. yds. carth excavation, 20 cts.; 164 lin. ft. 12-in. sewer pipe, 60 cts.; 570 lin. ft. 8-in. sewer pipe, 50 cts.; 570 lin. ft. 8-in. sewer pipe, 38 cts.; 4 manholes, each, \$35; 10 catch basins, each, \$15. Pacific ave., to

Granite City Lime & Cement Co., as follows: 9,100 sq. yds. brick paving, \$1.83; 3,300 lin. ft. sandstone curb, 60 cts.; 252 sq. yds. concrete header, \$1.90; 4,250 lin. ft. pitch expansion joint, 5 cts.; 9,400 sq. yds. earth excavation, 20 cts.; 560 lin. ft. \$3-in. sewer pipe, 38 cts.; 3 manholes, each, \$35, and 16 catch basins, each, \$15.

Peoria, III.—By City Council, to John W. Bushnell, at \$11,127, for resurfacing of Ravine ave., from Knoxville to Wisconsin sts.

of Ravine ave., from Knoxville to the consin sts.

Rock Island, Ill.—For paving 10th ave. with asphalt, to McCarthy Improvement Co., of Davenport, la., for \$4,200. Walter Treichler is City Engineer.

Shelbyville, Ill.—By City Council, for paving of 20½ blocks with brick, to Resee & Brown, at \$55,000.

Connersville, Ind.—By City Council, to Greenwood, Conner, Boots & Grant, Connersville, at \$1.02 per sq. yd., for construction of two miles of reinforced concrete paving.

Greenwood, Conner, Boots & Grant, Connersville, at \$1.02 per sq. yd., for construction of two miles of reinforced concrete paving.

Fort Wayne, Ind.—Board of Works has adopted material originally ordered for Weisser Park ave., Dawson and Harrison sts. and Wildwood and Douglas aves., awarding contracts to Grace Construction Co. Brooks Construction Co. will lay brick pavement on Monroe and Canat sts., according to awards made.

Muncle, Ind.—By Board of Public Works, as follows: To William Birch, for construction of curb and gutter in Eighth st., from Walnut st. to Port ave., at 42½ cts. per lin. ft.; to William Torrence, for construction of cement alley, between Council and Cherry sts., from Main to Washington sts., at \$1.55 per lin. ft.; to William Torrence, for construction of cement alley between Main and Washington sts., from Cherry to Council sts., at \$1.50 per lin. ft.; to William Torrence, for construction of cement alley between Main and Jackson sts., from Ohio ave. to to Wolfe st., at \$1.60 per lin. ft.; to William Torrence, for construction of cement sidewalk on East Council st., from Main north 222 ft., at 55 cts. per lin. ft.; to William Birch, for construction of cement sidewalk on west side of Macedonia ave., from First st. to south lot line of lot \$54 in Galliher's addition, at 67 cts. per lin. ft. Ekchmond, Ind.—For improving Easthaven ave., to Cronin & Meredith. This extends five-eights of mile. Also for Richmond and Liberty pike, length 2½ miles, to Philip Hipskind's Sons.

Terre Haute, Ind.—By Commissioners of Vigo County, for construction of Furgason gravel road, to H. B. Carpenter, of Cloverland, for \$8,700. Road is about 2-3 miles long.

Albia, Ia.—To Ford Paving Co., of Cedar Rapids, for brick block paving, 10,850 yds., at \$1.96; 8,160 ft. curb and gutter, at 55 cts. Des Moines, Ia.—To Lytton-Reinking Co., for grading preparatory to paving of West Grand ave., from west lile of Green.

55 cts.

Des Moines, Ia.—To Lytton-Reinking Co., for grading preparatory to paving of West Grand ave., from west line of Greenwood Park to east line of 56th st.

Des Moines, Ia.—By City Council, for 37,000 yds. bitulithic paving in Ingersoll ave., Tonawanda Drive, Polk blyd. and 43d st., to Jas. Horrabin Co., at \$1.95 per sq. vd.

Perry, Ia.—To Dell Moffitt, for construc-tion of cement curbs and gutters in sundry

Waverly, Ia.—Ford Paving Co., of Cedar Rapids, will probably be awarded contract for 30,000 sq. yds. of paving, at \$1.69 per sq. yd.

Hiawatha, Kan.—To O. C. Chapin, Leavenworth contractor, doing some street paving in Hiawatha, Kan. Mr. Chapin's figures on paving were \$1.22 per sq. yd. for Dolarway pavement and 50 cts. per lin. ft. for combined curb and gutter.

Jeanerette, La.—For constructing six miles of concrete sidewalks, to De Gerzey & Barnard, for about \$16,500.

New Orleans, La.—By Highway Department of Board of State Engineers of Louisiana, to L. B. Constauk, Alexandria, La., for construction of about 33 miles of highway, from Colfax to Montgomery, La.

Augusta, Me.—To Shawmut Construction Co., of Boston, for building Wells section of Kittery to Portland trunk line, at State Highway office. Bid of Shawmut company was \$31,490 for 13,000 ft. of concrete road.

Kennebunkport, Me.—For constructing 7,000 ft. of bituminous macadam pavement in Kennebunkport, to Clifford M. Wiley, of Bar Harbor, for \$15,700.

Grand Bapids, Mich.—By Board of Public Works, for paving of Eastern ave., to Carpenter & Anderson; also Fountain st. paving, to Carpenter & Anderson, who bid \$7.343.

Grand Bapids, Mich.—By Board of Public Works, for grading and graveling of Crescent st., to McDermott & Cooper at \$11,305.80.

Greenville, Mich.—To Jas. A. McKay, Grand Rapids, Mich., at \$5,156.45, for

grading, paving and improving portion of North Lafayette st.

Bemidii, Minn.—For four blocks of paving, to Goodman & Loitved.

Duluth, Minn.—E. A. Dahl was lowest bidder for standstone paving on 21st ave., at \$26,285. J. W. Preston, on granite paving, at \$27,677, and E. A. Dahl, for concrete paving, at \$27,677, and E. A. Dahl, for concrete paving, at \$27,677, and E. A. Dahl was lowest, at \$20,317. also for brick paving and cement filler with standstone between cartracks, at \$21,090, and for brick paving and cement filler with standstone between the tracks, at \$21,480. Also on Ramsey st. paving, creosote block, \$11,198; brick and cement filling, \$9,703, with asphalt filler, \$9,836, sandstone, \$11,318. J. A. Johnson was low on tar macadam, at \$9,659. Geo. R. King was low on grading and paving Fourth alley, \$1,360.

Refman, Minn.—To Alfred E. Kling, Donnelly, Minn., for grading two miles of road and excavating ditches along said roads in town of Eldorado.

Marble, Minn.—To A. Mitchell & Co., Bovey, Minn., for construction of 3,000 sq. yds. of cement concrete sidewalks, 6,000 lin. ft. curb and gutter and 6,000 yds. excavation, at Marble.

White Bear, Minn.—For macadamizing streets, as follows: Third st. and Stewart ave., Dolphus Arcand, White Bear Lake, Minn., \$3,364.50; Banning and Long aves., William Devine, New Brighton, Minn., \$5,990.

William Devine, New Brighton, Minn., \$5,090.

Kansas City, Mo.—By Board of Public Works, for curbing, sidewalks, paving. etc., to L. W. Pursell, G. M. Stack, Coumbe Construction Co.

Missoula, Mont.—To Nash & Nottingham, to pave Cedar st. with croosote block at \$26,469. Blocks will be tamarack and will be furnished by Kettle River Creosoting Co.

Montolair, N. J.—For opening and extending Cumberland ave., to Charles Bahr, of Verona.

Paterson, N. J.—For replacing present brick pavement with asphalt block, to Hastings Co., at \$1.75 per sq. yd.

Ashland, O.—For paving Maple st., 4,-125 sq. yds., with asphalt block, to D. A. Phillips, of Ashland, on asphalt block, concrete base and combined curb and gutter, for \$9,331.

Chardon, O.—For paving, to Munn &

ter, for \$9,331.

Chardon, O.—For paving, to Munn & Henderson, of Chagrin Falls, for \$14,480.

Columbus, O.—By State Highway Department, for grading and paving with waterbound macadam No. 1, Uncapher rd., State Highway "A" Petition No. 496 in Marseilles, length 10,593 ft., to Disher Bros., Upper Sandusky, at \$11,994.75, and for furnishing and placing \$50 cu. yds. loose limestone on Columbus rd., State Highway "E" Petition No. 389 in Cedarville, to Wilson Engineering & Contracting Co., Xenia, at \$1,402.50. James R. Marker, State Highway Commissioner.

Dayton, O.—To J. E. Conley & Co., by

ing Co., Xenia, at \$1,402.50. James R. Marker, State Highway Commissioner.

Dayton, O.—To J. E. Conley & Co., by Board of Control, for pavement of Hawthorne st., between Fifth st. and Germantown st., at their bid of \$7,875.60, and for pavement of Dunbar ave., from Fifth st. to Germantown st. at their bid of \$6,819.30. Good Roads Improvement Co. was awarded contract for oiling of Bradford st., from Wayne ave. to James st., at its bid of \$37.80, and Duldey st., from Washington st. to Hartford st., at its bid of \$37.80, and Duldey st., from Washington st. to Hartford st., at its bid of \$56.9 and First st., from Williams st. to Broadway, at its bid of \$60.90; the Great Miami blvd., from Main st. to Shaw ave., at its bid of \$\$5.60. Bond of Good Roads Improvement Co. in sum of \$6,000 was approved, as were bonds of other companies to whom contracts were awarded, among them being William Turner, sprinkling contractor; George Thoma, oiler, and Clifton Hoolihan, who was awarded the contract for improvement of Stewart st., from Wayne ave. west.

Delaware, O.—By Board of Commisioners of Delaware County, to Kissner Martt, city, at \$9,295, for grading and paving with water-bound macadam the Sunbury rd.

Lisbon, O.—For building of mile of tarvla road on Columbiana-Leetonia rd. out of Columbiana, by County Commissioners, to Wright & Morris, of Lisbon, for \$4,-339.45. It is to be made on limestone basis. William McClain, of Lisbon, also bid \$4,339.45 on job but his bid called for slag basis and Commissioners considered limestone preferable. Other bids were: W. H. Ralston, Salem, \$4,633.56; D. W. Challis & Son, Sewickley, Pa., \$4,538.69.

New Lexington, O.—By Board of Commissioners of Perry County, to Petrie & Lunsford, Logan, O., at \$11,400, for grading and paving New Lexington and Corning rd. James R. Marker, State Highway Commissioner.

Plymouth, O.—For 10,433 cu. yds. of excavation and 17,544 sq. yds. of water-

bound macadam paving, to Carroll & Gruber, of Caledonia, for \$14,533.

Dunmore, Pa.—By Borough Council, for paving jobs, as follows: South Blakely, st., MacDonald Construction Co., \$10,839,40; R. C. Ruthven, \$11,087.65; Warner-Quinlan Co., \$11,160.60. MacDonald being low bidder was awarded the contract. West Drinker st., MacDonald Construction Co., \$24,642.60; R. C. Ruthven, \$24,208.29; Warner-Quinlan Co., \$2,268.20. MacDonald was also awarded this job. Jefferson ave. and Marion st., MacDonald Construction Co., \$25,587.75; R. C. Ruthven, \$24,-897.15; Warner-Quinlan Co., \$25,532.80. R. C. Ruthven was iow and received the contract. New York st. was awarded to R. C. Ruthven was iow and received the Contract. New York st. was awarded to R. C. Ruthven for \$7,638.65; although the MacDonald Construction Co. was \$59 lower, they failed to submit a figure on the stone curbing. The bids per yard for asphalt ranged from \$2.19 to \$2.25, which is a little more than previous figures.

Exis. Pa.—For paving north line of 24th st., to Contractors McCormick & Son, their price being \$1.48 a yd. for Class B asphalt and \$1.60 for brick. Doyle bid was \$1.55 on asphalt and \$1.75 on brick. Mayers bid was \$1.60 on asphalt and \$1.66 for brick.

Extringuir, Pa.—By State Highway Commission, for Route 142, 10,334 ft. of

was \$1.55 on asphalt and \$1.75 on brick.
Mayers bid was \$1.60 on asphalt and \$1.66 for brick.

Harrisburg, Pa.—By State Highway Commission, for Route 142, 10,334 ft. of asphaltic macadam in Salisbury, to Geo. C. Souder, Lancaster, at \$31,354; Route 155, 45,460 ft. of asphaltic macadam, in Bucks County, to Union Paving Co., Philadelphia, at \$169,787; 1,337 ft. of concrete in Wharton, to Wyoming Valley Construction Co., West Nanticoke, at \$5,197.

YOFK, Pa.—To Contractor John Dobbling, this city, for building of new State road between New Oxford and Gettysburg by State Highway Department.

Gimer, Tex.—By Upshur County Commissioners, for 50 more miles of road, to McEleath & Wilson, at \$410 a mite.

Paris, Tex.—By Board of Permanent Road Commissioners, for building 40 miles of good roads in Precinct No. 1 of Lamar County, for which \$300,000 worth of bonds were voted several months ago. Bid of O'Neill Engineering Co., of Dalias, was declared lowest and best bid all way through on each class of work and contract was awarded to it. Company will begin at once assembling its machinery and material on ground to begin work. According to accepted bid roads will cost about \$6,000 per mile.

Ogden, Utab.—By City Commissioners, to J. P. Moran Co., Salt Lake City, at \$25,000, for paving of Grant ave.; from 23d to 24th sts., and intersections of Washington ave. with 23d, 24th and 25th sts.

Portsmouth, Va.—To F. J. McGuire, of Norfolk, for 30,000 sq. yds. of paving, at \$1.17 per yd., aggregating \$30,000.

Ellensburg, Wash.—By County Board, for paving two miles of State highway, from Ellensburg toward Thorp, to Dolarway Paving Co., at \$1.12½ per sq. yd. For paving 16,700 yds. of streets here, to R. M. Hardy, for Dolarway paving.

Leavenworth, Wash.—By County Commissioners, for constructing highway between Leavenworth and Peshastin, to Columbia Engineering & Construction Co., of Wenatchee, for \$9,588.

Tacoma, Wash.—To Washington Paving Co., 604 Savage-Scofield Bldg., for paving Delin, C, S. 38th and M sts. with asphalt, for \$69,147. City Engineer's estimate was \$85,000, and estimated yardage 35,000.

Tacoma, Wash.—County Commissioners

mate was \$85,000, and estimated yardage 35,000.

Tacoma, Wash.—County Commissioners have awarded one road contract conditionally and have taken another under advisement on grading of several miles of Tacoma-Puyallup rd. and on Kapowsin-Lake Head rd. Contract for latter road was awarded to Keasal-McDowell Logging Co., for \$7,200, with understanding that company obtain right-of-way where it is not already secured. This road will be about three miles long. Frank McHugh was low bidder on grading of Tacoma-Puyallup rd., from Tacoma city limits to Clarks Creek crossing, distance of about five miles. This award was taken under advisement. Bids and bidders follow: Tacoma Puyallup Rd.—Frank McHugh. \$21,735.50; Keasal Construction Co., \$23,900; Stoll & Holz, \$24,500, and E. M. More, \$24,500. Kapowsin-Lake Head Rd.—Keasal-McDowell Logging Co., \$7,200; A. H. Butler, \$8,740; C. A. & F. E. Fix, \$9,190; Herman Kendall and others. \$9,200; Hewitt & Moulton, \$11,000, and Stoll & Holz, \$11,682.

La Crosse, Wis.—By Board of Public Works, to Thos. E. Woolley, at \$4,068, for brick paving on the Mormon Coulee rd.

Milwaukes, Wis.—Contracts for paving of more than eight miles of rural highways in Milwaukee County, have been awarded by County Highway Commissioner H. J. Kuelling and County Board Committees on Highways, Bridges and

Railways, and Laws, Legislation and Rules. These contracts provide for the improvement of six roads, which are among important highways leading into Milwaukee. Contract for paving Chicago rd., from city limits to flag station, near Cudahy, to D. M. Sneddon Co., Milwaukee. This road will be paved with concrete, roadway being nine feet wide on each side of electric railway track. This firm offered to do work for 42 cts. a sq. yd. and the grading for 80 cts. Kilbourn rd., from city limits to intersection of Loomis rd., will also be paved with concrete. This is distance of approximately one mile. Roadway will be 18 ft. wide. The McGugan Co., Milwaukee, was awarded contract for this work. Other roads to be paved with concrete are North Fond du Lac rd., from city limits to Lake rd., distance of 1½ miles; Green Bay rd., from city limits to Hampton rd., 1½ miles; Janesville rd., from Western ave. to Hawley rd., two miles, and Loomis rd., from Kilbourn rd. to Layton ave. 1½ miles. All of these highways, with the exception of Janesville rd., will have a roadway 16 ft. wide. Janesville rd. will be 18 ft. in width. Contracts for improving North Fond du Lac and Green Bay rds. have also been awarded to McGugan Co. Paving will be done for 38 cts. a sq. yd. and grading for 80 cts. George Markey, Milwaukee, was given contract for work on Janesville and Loomis rds. He offered to do paving on Janesville rd. for 50 cts. a sq. yd., and grading for 80 cts. Loomis rd. will cost 53 cts. for paving and 50 cts. for grading. Eight firms entered bids on work.

BIDS RECEIVED

Peoria, III.—For paving Broadway, as Pollows: E. H. Faris, Morning Sun, la.—Paving, \$1.65½ per sq. yd.; curbing, 27 cts. per ft.; protection curb, 25 cts.; curbing around parking, 25 cts.; two catch basins, \$34 each. Jansen & Zoller, Pekin.—Paving, \$1.66; curbing, 25, 22 and 25 cts.; catch basins, \$34 each. Illinois Cement Construction Co., Springfield—Paving, \$1.79 for Barr brick, \$1.81 for Purington, \$1.81 for Culver; curbing, 26 and 25 cts.; catch basins, \$36. Keys & McNamara, La Salle—Paving, \$1.81 for Barr brick, \$1.83 for Purington or Culver; curb, 26 cts.; basins, \$36. S. A. Tuttle, Decatu—Paving, \$1.82 for Purington or Culver brick, \$1.80 for Barr; curbing, 27 cts.; basins, \$35.

26 cts.; basins, \$36. S. A. Tuttle, Decatur—Paving, \$1.82 for Purington or Culverbrick, \$1.80 for Barr; curbing, 27 cts.; basins, \$35.

Portland, Me.—For construction of five sections of street to be built as follows: India st., between Congress and Middle sts., 4,085 sq. yds.; Federal st., between Temple and Franklin sts., 5,961 sq. yds.; Forest ave., between Jackson School and Cumberland ave., 880 sq. yds.; Brighton ave., end of present paving to Nason's Corner, 3,200 sq. yds.; Veranda st., between Washington ave. and Martin's Point bridge, 2,851 sq. yds. The figures passed in by the bidders are as follows: Hassam Paving Co.—India st., \$1.43, alternate \$1.67; also same figures on Federal st. and Forest ave. work; Brighton ave. (a) 65c., (b) \$1.05, (c) 17c.; Veranda st., \$1.53. John W. Gulliver—India st., \$1.39. Federal st., \$1.24; Forest ave., \$1.29; Brighton ave., (a) 90c., (b) 60c., (c) 15c.; Veranda st., \$1.39. Maine Trap Rock & Contracting Co.—India st., \$1.24; Federal st., \$1.19; Forest ave., \$1.28; Brighton ave., (a) \$1.60. Forest ave., \$1.28; Brighton ave., (a) \$1.60. Forest ave., \$1.24; Federal st., \$1.19; Forest ave., \$1.28; Brighton ave., (a) \$1.60. Forest ave., \$1.28; Brighton ave., (a) \$1.60. Forest ave., \$1.28; Brighton ave., (a) \$1.60. Forest ave., \$1.26; Federal st., \$1.61; Forest ave., \$1.76; Brighton ave., no bid; Veranda st., \$1.81. ...

Hibbing, Minn.—For paving of second and Third aves. and Pine, Center and Cedar sts., as follows per sq. yd., with grading and everything complete: Warren Bros.—Bitulithic, \$2.55. P. McDonnell,—Wood block, \$2.77; bitulithic, \$2.63. Peterson & Johnson, Duluth—Wood block, \$2.57; 3½-in. wood block, \$2.96; 3-in. wood block, \$2.57; 5.5. Ending & Shipley, Minneapolis—3½-in. wood block, \$2.63. Peterson & Johnson, Duluth—Wood block, \$2.64. General Contracting Co.—Bitulithic, \$2.55. E. A. Dahl, Duluth—Wood. Garver Construction & Tra

Construction Co—Asphalt, 4-in. concrete base, 1-in. binder and 1½-in. surface, \$1.80 sq. yd.; same without binder, \$1.74; standard bituminous paving, \$1.63; same, light, \$1.53; excavation, 60 cts. cu. yd.; gutter, 55 cts.; sewer pipe, 60 cts. for 6-in. and 48 cts. for 4-in.; catch basins, \$15. Garren Construction Co.—Standard bitulithic, \$2 a yd.; 5-in gravel bitulithic, \$1.60; 4-in. gravel bitulithic, \$1.52; excavation, 70 cts.; drain pipe, 60 cts. for 6-in. 45 cts. for 4-in.; curb, 42 cts. for straight, 70 cts. for curved; catch basins, \$15. E. W. Geiger Construction Co.—Dolarway paving of various grades, from \$1.10 to \$1.36 a sq. yd.; excavation, 63 cts. a yd.; drain pipe, 58 cts. a ft.; curb, 38 cts. for straight, 75 cts. for curved; catch basins, \$22.50.

Seatle, Wash.—For grading and curb-

straight, 75 cts. for curved; catch basins, \$22.50.

Seatle, Wash.—For grading and curbing Genesee st., as follows: Geo. C. Dietrich & Co., \$62.670.47; Marks, Russell & Gallagher, \$75.863.90; W. F. Manney & Co., \$73.628.05; Sloane Bros., \$77.580.21; Andrew Peterson, \$68.897.55; P. J. Mc-Hugh, \$65.592.50; Holt & Jeffrey, \$66,-226.85; Andrew Peterson & Co., \$76.542.20; Zindorff & Elliott, \$70,432.35.

Superior, Wis.—For paving Tower ave., as follows: Asphalt—P. McDonnell, \$85,942.20; Zindorff & Elliott, \$70,432.35.

Superior, Wis.—For paving Tower ave., as follows: Asphalt—P. McDonnell, \$89.079; EdJohnson, \$90,941; E. A. Dahl,, \$91,897; Fielding & Shepley, \$91,606. Asphalt concrete—P. M. McDonnell, \$82,979; Fielding & Shepley, \$81,063. Brick—E. Johnson, \$92,019; P. McDonnell, \$92,547; P. E. Bergman & Co., \$92,572; M. Peterson \$95,341; E. A. Dahl, \$93,532; Russell Construction Co., \$91,473; Fielding & Shepley, \$94,021; S. H. Riches, \$94,095; John Diffor, \$95,399. Creosoted blocks—P. E. Bergman & Co., \$144,617; M. Peterson, \$112,299; Fielding & Shepley, \$105,550; Ed Johnson, \$100,469. Sandstone blocks—M. Peterson, \$124,462; E. A. Dahl, \$118,281; Fielding & Shepley, \$119,846. Concrete—M. Peterson, \$65,884.

SEWERAGE

SEWERAGE

Alabama City, Ala.—Citizens will shortly vote on \$50,000 bond issue for installation of sewerage system, etc.

Oak Park, Cal.—Board of Trustees, at recommendation of City Engineer, has ordered that portion of Oak Park between 31st and 36th, from Y st. to Park ave, be properly provided with sewage and drainage system.

Sacramento, Cal.—Election at which people of Sacramento will be asked to vote \$887,000 to carry out flood control plan of City Engineer George N. Randle and Levee Committee of Board of Trustees will be held on July 23.

San Francisco, Cal.—Property owners on Fifth st. have filed with Supervisors statement of need of new sewer in that street.

Cedar Falls, Ia.—Construction of 15 blocks of sanitary sewers has been or-

Cedar Falls, Ia.—Construction of 15 blocks of sanitary sewers has been ordered.

Council Bluffs, Ia.—Resolution has been adopted for construction of sewers in various streets.

Dubuque, Ia.—Council has ordered construction of 1,278 lineal ft. of sewers and 6 manholes to cost \$1,359.

Topeka, Kan.—Sewer to cost \$175,000, containing 10 miles of mains and serving territory comprising 3,000 lots, has been planned by W. G. Tandy, City Commissioner, and will be placed before next meeting of Board of City Commissioners for approval. Sewer starts on College Hill and takes course due north through West Elmhurst, Melrose, Auburndale and empties into the river. New sewer covers entire western border of city.

Boston, Mass.—City Council has authorized appropriation of \$100,000 for construction of sewerage works.

Lewistown, Mont.—All bids for sewer system have been rejected and new bids will be asked for.

Elizabeth, M. J.—Ordinance has been passed to build and construct sewer, together with house drainage connections, in Garden st., from intercepting sewer to point about 150 ft. east of Maple ave.

Wildwood, M. J.—Sewer, sidewalks and curbs on Baker ave. will be extended 200 feet oceanward.

Springfield, O.—Resolution has been adopted for construction of sanitary sewer in first alley east of Lagonda ave.

Youngstown, O.—Ordinance has been passed for construction of sewer, from Spruce st. to Federal st. M. F. Hyland, Clerk.

Altoona, Pa.—At special election electors authorized increase in bonded debt of city in sum of \$150,000.0 \$100,000 of which

Clerk.

Altoona, Pa.—At special election electors authorized increase in bonded debt of city in sum of \$150,000, \$100,000 of which will be used to construct sewage disposal plant and \$50,000 for resurfacing five paved streets.

Scranton, Pa.— Ordinance has been passed providing for lateral sewer on Theodore st. and Ralph ave. in Second

Ward, and for opening of Penn ave., from Ash st. to Phelps st.

Bartlett, Tex.—Civil engineers are busy making survey for sewer system that will soon be installed here.

Sherman, Tex.—City Council has called election for July 25 for voting on \$198,000 bond issue to be divided between sewerage, street paying, fire improvements and water extension.

Spokane, Wash.—Plans for new im-

and water extension.

Spokane, Wash.—Plans for new improvement have been submitted to City Council for approval. It calls for construction of sub-trunk sewer in Union Park, at cost of \$17,784.

**Relson, B. C., Can.—By large majority by-laws to issue debentures for extensions to sewers and water works have been passed; \$15,000 will be expended.

CONTRACTS AWARDED

Los Angeles, Cal.—To John Balch, at \$11,998, for construction of sewer in Alameda st., between Eighth and 21st sts.

Pt. McPherson, Ga.—By constructing Quarter Master at Ft. McPherson, for furnishing material and constructing sewage purification plant, to Municipal Engineering & Construction Co., 703 Empire Bldg., Atlanta, for \$23,980.

Presport, III.—To F. E. Kaminski, Watertown, Wis., at \$12,500, for constructing 2½ miles of sanitary sewer.

Bockford, III.—To Mulholland & Kuehn, at \$2,431.50 and \$3,278.14, for Harlem ave. and Daisy ave. sewers.

Rockford, III.—To Mulholland & Kuehn, at \$2,431.50 and \$3,278.14, for Harlem ave. and Daisy ave. sewers.

Elkhart, Ind.—For constructing sewers, as follows: Studebaker Addition, Elkhart Construction Co.; Arcade ave. and Fulton st., Frank Mills; Indiana ave., Northern Construction Co.

Goshen, Ind.—By City, for constructing lateral sewer in West Goshen, to C. E. Kutz, of Goshen, for \$6,450.

Muncie, Ind.—By Board of Public Works, to Lyons & Delaney, for construction of local sewer in Council st., from Willard st. north 585 ft., known as Council st. sewer No. 3, at \$663.80.

Burlington, Ia.—For constructing 16-ft. span concrete arch sewer with necessary catch basins, manholes and appurtenances along Hawkeye Creek, to Burlington Construction Co., \$23.30 per ft. Other bids as follows: D. J. Ryan & Co., Davenport, Ia., \$33.75; Midland Engineering & Construction Co., Fort Scott, Kan., \$28.70; John Loftus, Burlington, \$40.90; Young & Buesther, Burlington, \$4.90; Young & Buesther, Further, on Sycamore st.

Whittemore, Ia.—For construction of sewer on Sycamore st.

Whittemore, Ia.—For construction of sewer on Sycamore to construction of sewer on Sycamore st.

Whittemore, Ia.—For construct sewer system here, to J. E. Palmer, Amesbury, at \$52,000.

Grand Rapids, Mich.—To Vanderwelle Bros., 810 E. Fulton st., at \$17,700, for

system here, to J. E. Palmer, Amesbury, at \$52,000.

Grand Rapids, Mich.—To Vanderwelle Bros., 810 E. Fulton st., at \$17,700, for construction of sewers in Canal st.

Laverne, Minn.—To Greene, Delate & Fritz, to construct sewers in various streets, at from 56 to 87 cts. per ft.

St. Paul, Minn.—Bids on five sewers have been opened by Board of Public Works three of which were awarded at figures below estimates of City Engineer. P. J. Ryan submitted low bid of \$1,418 for laying of sewer on McLain ave., from Cyprus to Mound sts., in face of estimate of \$1,478 by engineer. Contract for laying sewer on Vernon ave. was awarded to C. A. Carlson & Son on bid of \$658, against engineer's estimate of \$726.

Hannibal, Mo.—For 20,000 lin. ft. of 12-to 6-in, vitrified pipe sewer and one mile 12½ x 2½ x 6 x 8 concrete tile sewer in District No. 200, to F. L. Hall, of Hannibal, for \$24,449. B. F. Smiley is City Engineer.

Kansas City, Mo.—By Board of Public Works to Berker, Westington Co. South

Engineer.

***Xansas City, Mo.—By Board of Public Works, to Parker. Washington Co., Southwest blvd. and Penn st., at \$45,047, for construction of reinforced concrete sewer in Swope Parkway.

**Bloomfield, N. J.—For construction of sewer in Watchung ave., to James T. Boylan, at \$6,687.50.

**Jersey City, N. J.—For construction of sewer in Stegman ave., to Charles O'Nell. South Amboy, N. J.—To construct Mechanicsville section of sanitary sewerystem, to Collins & Gundrum, South Amboy, at \$9,635.

Frankfort. N. Y.—For constructing sew-

Prankfort, M. Y.—For constructing sew-ge disposal plant, to Aetna Engineering Contracting Co., Herkimer.

Norwich, M. Y.—For constructing sam-ary sewers in South Broad st., Jones ve. and other streets, to Nash, Robinson & Griffin, Norwich, at \$5,749.

Yonkers, M. Y.—By Board of Control and Supply, to O'Rourke Construction Co., t \$5,060, a contract to lay sewers in cortions of Colgate ave.

Canton, O.—For section 1 of Sewer Dis-

Canton, O.

trict No. 4, to John Sheeles, Canton, at \$5.113.

\$5,113.

Canton, O.—To John Skeeles, city, for sanitary sewers in sundry streets.

Erie, Pa.—For 30-in. storm water sewer in West 29th and other streets, to Contractor F. J. Eichenlaub on his bid of \$1.98 for main pipe, \$1.19 for 24-in. pipe, \$1 for 20-in. pipe, bringing his contract to \$12,395.02. McCormick's total bid was \$12,732.35. J. & M. Doyle bid \$2.10 a ft., and Edward Driscoll \$2.60 a ft. on male sewer.

and Edward Driscoll \$2.60 a It. on management.

Easteon, Pa.—To Ludwig & Cramer, city, for construction of \$00 ft. of 18-in. terra cotta sewers in Grant st.

South Bethlehem, Pa.—For construction of Thomas st. sewer, to S. W. Chiles, at his bid of \$1,337.60.

**Salt Lake City, Utah.—By City, for sewers, as follows: Extensions No. 299 and 305, to T. J. Everill Co., \$1.16; 301, to J. F. Johnson Co., \$1.19; 302, to A. A. Clark Co., \$1.35; 303, to L. R. Weber, \$1.45.

**Tt. Myer, Va.—To M. J. McCarthy, Washington, D. C., at \$929, for alterations in connection with sewer system at Ft. Myer.

Tend. Wash.—To construct sewers.

Ft. Myer.

South Bend, Wash.—To construct sewers in District A, to Jahn Construction
Co., Seattle, Wash., at \$25,610.

Mapanee, Ont.—For sewage disposal works and outfall sewers, to Construction Service Co., of Guelph, Ont.

WATER SUPPLY

Alabama City, Ala.—Citizens will shortly vote on \$50,000 bond issue for construction

vote on \$50,000 bond issue for construction of water works, etc.

Winthrop, Ark.—Installation of water works system has been authorized.

Burlingame, Cal.—Experts retained by Board of Trustees have reported in favor of municipal water system. Cost will be \$175,000, and it is proposed to bond city for this amount.

Augusta, Ga.—City will issue \$1,250,000 worth of bonds as follows: For water works improvements, \$100,000; for flood protection, \$1,000,000, and for hospitals, \$150,000.

Coolidge, Ga.—Town will

\$150,000.
Coolidge, Ga.—Town will expend \$9,000 for water and light plant.
Valdosta, Ga.—Election will be held July 16 for voting on \$55,000 bond issue for enlarging water plant.
Barrington, III.—Construction of filtration plant has been authorized; estimated cost, \$13,000.
Charleston, III.—Bonds in sum of \$40,000 have been sold for water works improvements.

Cost, \$13,000.

Charleston, Ill.—Bonds in sum of \$40,000 have been sold for water works improvements.

Fortville, Ind.—It is proposed to install
water system here to cost \$15,000.

Audubon, Ia.—Election will be held July
12 for voting on \$6,500 bond issue for construction of water works system.

Ireton, Ia.—Bids are being received for
extension of water mains.

Mashua, Ia.—Construction of water
works system has been authorized.

Mansfield, La.—Plans have been prepared for water works improvements, to
cost about \$56,000.

Baltimore, Md.—Mechanical filtration
plant near Loch Raven, which Water
Board has decided is best for Baltimore,
will cost \$1,633,000 for its construction
and \$193,450 per year for upkeep. Work
will start upon new plant as soon as plans
can be drawn by expert.

Detroit, Mich.—Bids will be received at
office of Board of Water Commissioners
up to 4 p.m., July 9, for purchase of
\$240,000 in bonds of Board of Water Commissioners.

Kalamazoo, Mich.—City Council will

**S240,000 in bonds of Board of Water Commissioners.

Ealsmazoo, Mich.—City Council will consider proposition of submitting question of purchasing \$10,000 water pipe to voters at special election to be held latter part of July.

Ealsmazoo, Mich.—Plans for new stand pipes and other water works improvements, to cost \$55,000, will be prepared at once.

stockbridge, Mich.—Bonds in amount of 10,000 will be issued for construction of the water works.

Duluth, Minn.—Four or five large arwisian wells will be sunk in New Duluth; 19st, \$20,000.

tesian wells will be sunk in New Duluth; cost, \$20,000.

Minveapolis. Minn.—City has appropriated \$500,000 for enlarging and improving water system.

Fromberg, Mont.—It is said that plans are being prepared for water works system by Schenck-Nowell Engineering Co., of Basin, Wyo.

Homer, Neb.—Bonds in amount of \$10,000 have been issued for construction of new water works.

Omaha, Neb.—Meter system will be installed by Water Board.

Syracuse, N. T.—Common Council will be asked to appropriate \$5,000 for extension of water mains.

Weaverville, N. C.—Bond issue is being considered for construction of municipal water works.

Canton, O.—Plans are said to be completed for concrete reservoir of 6,000,000-gal. capacity, to cost about \$100,000.

Dayton, O.—Issue of \$120,000 water works bonds have been awarded Weil Roth & Co., of Cincinnati, at a premium of \$720.

Hastings, Okla.—By vote of two to one this city voted bond issue of \$15,000 to complete water works at this place.

Quinlan, Okla.—Installation of municipal water works is being considered.

Altoona, Pa.—With approval by voters of city of measures providing for municipal loans of \$150,000 for filtration plant, and resurfacing of paved streets, matter is now in hands of Councils, and at next meeting what is known as enabling ordinance will be introduced and passed as soon as possible.

Coatesville, Pa.—Council has negotiated loan for \$25,000 to be used for water and street purposes.

street purposes.

Johnstown, Pa.—City is considering installation of municipal water system.

McKeesport, Pa.—Purchase of new electric pump for Tinplate Hill station has been authorized.

been authorized.

Pittsburgh, Pa.—The city of Pittsburgh will shortly call for bids on new pumping station at Aspinwall. Bids will relate to superstructure, estimated cost of which is \$170,000. Contracts have been awarded for equipment and foundations are finished.

ished.

Johnson City, Tenn.—To complete water works system, 13 miles of 16-in. pipe will be laid from city to Big Blue Springs in Unicoe County.

Marfs, Tex.—Installation of water works system is being considered.

Marfa, Tex.—Installation of water works system is being considered.

Dallas, Tex.—It is estimated by Water Commissioner that installation of water purification plant will alone cost \$145,000.

Madisonville, Tex.—Special election will be held July 15 for voting on \$16,000 bond issue for construction of new water works.

Shamrock, Tex.—City will erect 100,-000-gal, steel water tank, 100 ft. high, and lay sufficient 8 and 4-in. mains to protect 90 per cent. of buildings within corporate limits. Water will be pumped 1½ miles from springs. Dam will be constructed below springs that will hold in reserve several million gallons of water.

Sherman, Tex.—City Council has called election for voting on \$198,000 bond issue to be divided between water extension, sewerage, street paving, etc.

Norfolk, Va.—Another step toward establishment of municipal water works in city has been taken at meeting of finance committee. Committee has decided to recommend to Council at its next meeting sale of \$600,000 bond issue to provide system it is planned to erect.

Oakville, Wash.—Installation of water works system is being considered.

Cody, Wyo.—Special election will be held for voting on \$30,000 bond issue for rebuilding water works system.

Calgary, Alta, Can.—Election will shortly be held for voting on \$500,000 bond issue for construction of new high-pressure gravity water system.

Telson, B. C., Can.—By large majority by-laws to issue debentures for extensions to water works and sewers have been passed; sum of \$15,000 will be expended.

CONTRACTS AWARDED

Los Angeles, Cal.—To Arthur S. Bent Construction Co., Central Bidg., for furnishing and laying 9,000 ft. of 10-in. concrete pipe line in Zuma Canon of Malibu Ranch. Contract for 2.000 ft. of 10-in. steel pressure line and 300 ft. 12-in. steel syphon, to Baker Iron Works. System will be equipped with Kellar-Thomason gates. Dressery & West, Hibernian Bidg., are Engineers.

Biverside, Cal.—To lay 8,000 ft. of 14-in. steel pressure line and 5,000 ft. of 16-in. vitrified pipe in Laguna Valley, to Martin & Chapman, Riverside.

New Britain, Conn.—By City, to Stimpson Bros., for erection of reinforced concrete standpipe, with capacity of 350,000 gals.

Bock Island, Ill.—For water mains on 30th and 35th sts., 14th to 18th aves., to P. F. Trenkenschuh, of Rock Island, for

P. F. Trenkenschuh, of Rock Island, for \$9,050.

South Bend, Ind.—For furnishing new 10,000,000-gal. pump for local water works, to Henry R. Worthington Co.

Beinbeck, Ia.—To M. A. Camery, of Harlan, for installation of complete water works system at his bid of \$31,533.

Beinbeck, Ia.—To M. McIlligott, for 6,000 ft. of water mains, at \$4,000.

Athol, Mass.—By Water Department, for construction of slow sand filtration plant, to J. M. Dineen & Son, of Easthampton, for \$12,200. Other bidders: Henry W. Warner. Northampton, \$18,700: Leepardo & Way, Springfield, \$16,912: William Orlando, Belchertown, \$16,000; Arbert A. Bullard, Urbridge, \$14,000, and R.

L. Whipple & Co., Worcester, \$13,950. Engineer is Jas. L. Tighe, of Holyoke.

Boston, Mass.—For excavating and refilling various trenches, regulating boxes, establishing hydrants, to Hugh McNulty, at \$12,102. Other bids were: Ferguson & Kelly, \$12,850; Thomas Burke, \$16,671; Hugh J. McGuire, \$18,522.

Hugh J. McGuire, \$18,522.

**Borth Attleboro, Mass.—For high-duty horizontal, cross-compound crank and fly wheel pumping engine of opposed type, 2,500 gal. capacity, to Epping-Carpenter Co., Pittsburgh, Pa. Following bids were received: Allis-Chalmers Co., Milwaukee, Wis., \$9,900; Epping-Carpenter Co., Pittsburgh, Pa., \$7,410; Laidlaw-Dunn-Gordan Co., Cincinnati, O., \$8,375; Platt Iron Works, Dayton, O., \$8,325; Hoovens, Owens, Rentschler Co., Hamilton, O., \$13,600. Bids were also received on "extended" or rolling mill type, as follows: Laidlaw-Dunn-Gordan Co., Cincinnati, O., \$7,350; Platt Iron Works, Dayton, O., \$8,303; Hooven, Owens, Rentschler Co., Hamilton, O., \$12,600.

Geneseo, M. Y.—To construct reservoir and lay cast iron mains, by Water Commission, to Halloran Bros., Geneseo, at \$8,541. Other bids were: Gregory & Scully, \$8,517; Lawrence Leonard, \$8,085; P. H. Murray, \$11,286; J. D. Fuller, \$8,854.

Granville, N. Y.—To construct rein-creed concrete reservoir, for water works William L. Town, Poultney, Vt., at \$8,444

Wolcott, M. Y.—By Board of Village Trustees, for construction of about six miles of cast iron mains, standpipe, small reservoir, pump house, two electric-driven power pumps and other accessories, as follows: For general construction, to Fischette Bros., of Clyde, for \$34,000; standpipe, to Conway & Co., Ltd., Philadelphia, Pa., at \$2,295.

Findley, C.—For 3,000,000-gal, pumping engine to be installed at Riverside Park pumping station, to Canton-Hughes Pump Co., of Wooster, for \$8,510.

Co., of Wooster, for \$5,010.

Boldenville, Okla.—By City Council, for extension of city water works, as follows: To Brittain & Votaw, for reconstruction of power house at reservoir, \$1,650; J. S. Terry Construction Co., for pipe line, pump house and pit at river, and transmission line, \$4,458; Webb Electrical Co., of Holdenville, for building transmission line, and the Pittsburgh Filter Mfg. Co., Pittsburgh, Pa., for 500,000-gal. filter plant for \$6.698. line, and the Pittsbur Pittsburgh, Pa., for plant, for \$6,698.

plant, for \$0,000.

Erie, Pa.—By Water Commissioners, for two low service pumps, to Wood & Shepard Co., Philadelphia, Pa., at \$17,500. Other bidders as follows: Allis-Chalmers Co., Milwaukee; William Todd Co., Youngstown, O.; International Steam Pumping Co. (Worthington pumps), New York; Corliss Engine Co., Erie; Bethlehem Steel Co., South Bethlehem, Pa., and Holly Manufacturing Co., Buffalo, N. Y.

Cleburn, Tex.—At meeting of City Council bids were opened and city saved \$3,195 over lowest bid turned in on May 11. N. S. Sherman, of Oklahoma City, was given contract for laying water mains. Total bid was \$5,277. Contract for building brick pumping station was let to J. A. Thomas. Total bid was \$7,777.77. Contract was let to Faucett & Hall for sinking deep well at \$4.75 per ft.

Terrell, Tex.—By City Commission, for installing water works, to Lane-Bowler Co., of Houston. Contract calls for 500,-000-gal, daily, at cost of \$14,500, exclusive of conduits to city reservoir at plant.

Worfolk, Va.—To Guild & Co., of Chattanooga, Tenn., for construction of water mains in Ninth and 10th Wards.

LIGHTING AND POWER

St. Petersburg, Pla.—St. Petersburg is advertising for gas franchise to be let to highest and best bidder.

Decatur, Ga.—Mass meeting of the citizens of Decatur will be held to discuss question of proposed bond issue of \$15,000 to erect municipal electric light plant to run in connection with water works system. system

Evansville, Ind.—Erection of municipal electric lighting plant is being considered.

Bennet, Ia.—Installation of municipal lighting system has been authorized.

Shell Rock, Ia.—Uri Richards and Wm. Richards have been granted electric light franchise.

Sall Sock, in.—Orr Archards and Wink. Richards have been granted electric light franchise.

Woodland, Ia.—Franchise has been granted to Boone Electric Co.

Taylorsville, My.—City is contemplating installation of electric light system.

Kalamazoo, Mich.—Plans for municipal lighting plant and ornamental lighting system to cost \$140,000 will be prepared at once.

Daiuth, Minn.—It has been decided to install white way from Garfield ave. on Superior st. to 22d ave. west.

Mount Iron, Minn.—Bonds in sum of \$50,000 have been voted for erection of power plant.

Cleveland, O.—Bids on material necessary to start work on proposed electric light plant will shortly be advertised. Estimated cost of plant is \$900,000.

Columbus, O.—All bids received for cluster light system have been rejected and work will be readvertised. Henry Maetzel is City Engineer.

Redfield, S. Dak.—New lighting system will be installed on Humboldt st.

Athens, Tenn.—Citizens have voted bonds for \$38,000, for purpose of constructing electric light plant and water works.

CONTRACTS AWARDED

San Francisco, Cal.—To Newberry-Bendheim Electric Co., at \$9,304, for constructing electric light system at Letterman General Hospital.

Albany, Ga.—For installation of electric light system on Pine, Washington and Jackson sts., to Albany Electrical Supply Co.

Joint, Ill.—To Public Service Co., of Northern Illinois, for lighting streets for period of one, threee, five and 10 years.

Jackson, Minn.—For installing electric day power system, to J. G. Robertson, of St. Paul.

Chattanooga, Tenn.—For lighting Ft.

St. Paul.

Chattanooga, Tenn.—For lighting Ft. Oglethorpe, to W. P. Berry, of Brooklyn, N. Y. Work will cost between \$3,200 and \$3,300 and will be pushed to completion. It will embrace thorough installation of lights and fixtures all over post quarters and on parade grounds.

FIRE EQUIPMENT

Selma, Ala.—City Council will probably authorize purchase of motor-driven fire-fighting machine.

Talladega, Ala.—Resolution has been passed by City Commission for purchase of combination auto fire truck and chemical warpen.

of combination auto fire truck and chemical wagon.

Hillsborough, Cal.—Bids will be received for auto chemical engine, hose, etc.

Nevada City, Cal.—Nevada City is to have new auto chemical fire engine to cost not more than \$5,000. This was decided by Trustees when representative committee from volunteer department stated they would furnish \$2,000 if Trustees would pay balance.

Oroville, Cal.—Bids will be advertised for modern auto chemical and hose wagon.

Bichmond, Cal.—Bonds in amount of

Bichmond, Cal.—Bonds in amount of \$50,000 may be issued for improvement or

Fire Department.
San Diego, Cal.—Purchase of underground cable for fire and police telegraph

system has been authorized by City Coun-cil.

Ventura, Cal.—Purchase of additional equipment for Fire Department is pro-

Americus, Ga.—Purchase of 1,000 ft. of hose for Fire Department has been plan-

Canton, III.—Bids are being received for two auto chemical engines, two auto com-bination chemical and hose trucks, one auto combination chemical and hose squad

auto combination chemical and hose squad truck and other equipment.

Decatur, III.—Erection of additional fire station to be located on Locust and Passpar sts., has been authorized by Council.

Springfield, III.—Orders for removal of No. 1 engine house and repairs and improvements to cost \$2,000 have been insued at meeting of Commissioners.

Wankegan, III.—City will have new fire station shortly.

Davenport, Ia.—Purchase of auto apparatus is being discussed.

Sloux City, Ia.—New fire station will be erected.

Boston. Mass.—Plans of Commissioner

Sioux City, Ia.—New fire station will be erected.

Boston, Mass.—Plans of Commissioner of Public Works Louis K. Rourke for building of pumping station for high pressure fire system under Charles st., have been approved by Directors of Chamber of Commerce.

Mew Bedford, Mass.—City is planning purchase of additional motor apparatus.

Grand Rapids, Mich.—Bids will shortly be required for two motor hose wagons, one motor-driven truck and one chiefs auto.

Lansing, Mich.—City is considering purchase of aerial truck and motor fire engine.

Lansing, Mich.—City is considering purchase of aerial truck and motor fire engine.

St. Joseph, Mo.—City is considering proposition to purchase motor apparatus shortly.

Butte, Mont.—Purchase of motor combination wagon is contemplated.

Grand Island, Neb.—Purchase of combination chemical and hose wagon, motor propelled, is being considered.

Bayonne, N. J.—City Council has ordered without formality of inviting bids 500 ft. of fire hose to in some measure make up loss of 800 ft. burned at A. W. Booth & Brother lumber yard fire. Another 1,500 ft. of hose will be purchased after bids are received at next meeting.

Albany, N. Y.—City is in market for 3,000 ft. cotton rubber lined 2½-in. fire hose and auto chemical and hose wagon. W. W. Bridgeford is Chief.

Binghamton, N. Y.—Common Council has passed ordinance authorizing purchase of fire apparatus in open market.

Brooklyn, N. Y.—Plans have been approved by Building Department for three new firehouses in Borough of Queens, to cost \$48,500 each. All will be two story brick structures.

Bochester, N. Y.—Public Safety Com-

cost \$48,500 each. All will be two story brick structures.

Rochester, N. Y.—Public Safety Committee of Common Council is considering site for new fire house.

Winston-Salem, N. C.—Erection of new fire station has been authorized.

Cleveland, O.—Sum of \$28,000 has been appropriated for purchase of new fire engine.

East Liverpool, O.—Bond issue of \$33,000 is being considered for purchase of the apparatus.

Mansfield, O.—Director of Public Safety has under consideration the purchase of motor apparatus. Geo. Knofflock, Chief.

Richwood, O.—Bids are being advertised for combination auto fire engine and hose

wagon.

Portland, Ore.—Erection of two additional fire stations, to cost \$75,000, has been decided upon.

Allentown, Pa.—Purchase of motordriven steamer is being considered.

Erle, Pa.—New fire truck will be purchased.

Beaver, Pa.—City is considering pur-chase of motor fire truck.

Albany, W. Y.—At office of Duncan W. Peck, State Superintendent Public Works, Albany, for Contract 89, Eric Canal Section 8 of the State Canal work, comprising construction of five superstructures and one sub-structure for highway bridges over Eric Canal, between Lyons and Falmyra, on Contracts 48, 76 and 77—(1) Engineer's estimate; (2) Owego Bridge Co., Owego; (3) Lupfer & Remick, Buffalo; (4) H. D. Robinson, New York City; (5) United Construction Co., Albany; (6) Lane Bridge Co., Pantied Post; (7) Penn Bridge Co., Beaver Falls, Pa.:

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|--|----------|----------|----------|----------|-----------|----------|----------|
| Cofferdam pumping, bailing and draining (lump sum) | \$500.00 | \$500.00 | \$600.00 | \$500.00 | \$600.00 | \$500.00 | \$600.00 |
| 1,760 cu. yds. excavation | .75 | .75 | .15 | .75 | .90 | .50 | .90 |
| 1,590 cu. yds. embankment | .20 | .20 | .10 | .20 | .24 | .20 | .20 |
| 70 Cu. vds. lining | 1.50 | 1.50 | 1.50 | 1.50 | 1.80 | 1.50 | 1.50 |
| 22 M. It. treated vellow bine | 60.00 | 6000 | 65.00 | 65.00 | 72.00 | 60.00 | 65.00 |
| 1,760 kin. ft. foundation piles | .35 | .35 | .35 | .35 | .42 | .30 | .40 |
| 250 cu. yds. 2d class concrete | 7.50 | 7.50 | 7.00 | 7.50 | 9.00 | 7.00 | 9.00 |
| 490 cu. yds. reinforced concrete | 13.00 | 13.00 | 12.00 | 13.50 | 15.60 | 11.50 | 13.00 |
| 3 cu. yds. 1st class masonry copings | 30.00 | 30.00 | 30.00 | 35.00 | 36.00 | 25.00 | 30.00 |
| 1,000,000 lbs. structural steel | .045 | .04 | .0455 | .05 | 0.4 | .044 | .043 |
| 100,000 lbs. metal reinforcement | .035 | .03 | .025 | .035 | .035 | .03 | .0325 |
| 970 sq. yds. wood-block paving | 2.50 | 2.50 | 2.50 | 2.50 | 2.75 | 2.50 | 2.50 |
| 160 lin. ft. wooden fence | .20 | .20 | .20 | .20 | .24 | .20 | 2.00 |
| 940 lin. ft. lattice railing | 1.75 | 1.75 | 1.75 | 1.85 | 1.75 | 1.50 | 2.00 |
| The same and | 1.10 | 1.10 | 1.10 | 1.00 | 1.10 | 1.00 | 2.00 |
| Potola | 90E 110 | PEQ 616 | 200 000 | STA FOA | 0.00 0.07 | PC1 070 | 604 ABB |

Gettysburg, Pa.—Purchase of motor apparatus is being considered.
West Chester, Pa.—West Chester Council recommends \$25,000 loan for new bor-

cil recommends \$25,000 loan for new borough fire apparatus.

Brownwood, Tex.—Plans are being considered for erection of central fire station and City Hall.

Dallas, Tex.—One of new city fire stations will be erected on Young st. Just east of Browder st.

Sherman, Tex.—City Council has called election for voting on \$198,000 bond issue to be divided between enlargement of fire department, street paving, sewerage and water extension.

Albion, Wash, will organize a volunteer fire department.

Albion, Wash., will organize a volunteer fire department.

Bellingham, Wash.—City is considering purchase of combination car for the Fire Department.

Puyallup, Wash.—It is proposed to erect a new fire station here shortly.

Milwankee, Wis.—Purchase of motor fire truck, to cost \$6,000, has been recommended.

a new fire station here shortly.

Milwankee, Wis.—Purchase of motor fire truck, to cost \$6,000, has been recommended.

Racine, Wis., may purchase two autofire engines. Jas. Cape, Jr., Chief.

Racine, Wis.—Bid of American-La France Co., on two pieces of power fire apparatus was lowest, amount asked for both auto engines being \$17,500. However, after bids had been read by City Clerk it was decided to turn matter over to consideration of committee of whole. Bids received were: Knox Auto Co., model 9 triple combination pumping engine, \$11,000; chemical engine and hose wagon, \$9,000. Webb Motor Co., combination chemical engine and hose cart, \$8,000. Ahrens-Fox Fire Engine Co., \$10,000 apiece for either style of engine. Nott Fire Engine Co., chemical engine and hose cart, \$8,600. Robinson Fire Apparatus Co., various figures for either engine, varying as to different grades, \$8,500, \$9,000 and \$10,000. American-La France Co., combination pumping engine, with chemical tank, \$9,000; or both style engines for \$17,500. Melson, B. C., Can.—By overwhelming majority by-laws to issue debentures for

welson, B. C., Can—By overwhelming majority by-laws to issue debentures for new fire hall and for extensions to sewers and water works have been passed. Twenty thousand dollars is to be expended on fire hall and \$15,000 on water works and sewers.

CONTRACTS AWARDED

Ottawa, Kan.—To Eureka Fire Hose Mfg. Co., for 500 ft. of "Red Cross" fre hose and 100 ft. of suction hose.

Bed Wing, Minn.—To Chicago Fire Hose Co., for furnishing this city with 1,000 ft. of 2½-in. fire hose and 200 ft. of chemical hose at 90 cts. and 28 cts. per foot, respectively.

cal hose at 90 cts. and 28 cts. per foot, respectively.

Marietta, 0.—To Seagrave Co., of Columbus, O., for furnishing new aerial truck for Marietta Fire Department. Only other bidder was American-La France Fire Engine Co., of Elmira, N. Y.

Altoona, Pa.—By City, for new combination chemical and hose wagon for Fire Department, to Knox Motor Truck Co., of Springfield, Mass., at \$5,600.

BIDS RECEIVED

Atlanta, Ga.—For new fire alarm system, by Board of Fire Awards, as follows: Star Electric Co., \$57,000, and Gamewell Fire Alarm Telegraph Co.,

lows: Star Electric Co., \$57,000, and Gamewell Fire Alarm Telegraph Co., \$67,000.

Boston, Mass.—For three motor combination hose and chemical wagons and three motor combination ladder and chemical wagons. Bids for motor combination hose and chemical wagons were as follows: Victor Motor Truck Co., \$4,700 each; Peerless Motor Car Co., \$5,000 each; Webb Fire Motor Apparatus Co., \$5,250 for one, \$5,100 for two, and \$5,000 for one, \$5,100 for two, and \$5,000 for one, \$5,100 for two or more; Motor 40 h.p., and \$6,500 for 60 h.p.; American-La France Fire Engine Co., \$5,500 for one and \$5,250 for one and \$5,250 for two or more; for 6-cylinder motor, \$6,000 for one and \$5,500 for one and \$5,6600 for one, \$5,600 less 2½ percent for three; Seagrave Co., \$5,290 for 4-cylinder motors and \$5,640 for 6-cylinder motors, \$200 each less for two wagons and \$350 each less for three wagon. For motor combination ladder and chemical wagons, bids were: Peerless Motor Car Co., \$5,300; Victor Motor Truck Co., \$5,650 for a 4-cylinder and \$200 additional for a 6-cylinder Botor or \$6,250 for two or more; Seagrave Co., \$6,150; Knox Automobile Co., \$6,200 less 2½ percent for three; Webb Fire Motor Apparatus Co., \$6,800 each, or \$6,600 for two and \$6,400 for three. Bids were also opened for seven runabouts for fire chiefs, as follows: Carter car, \$1,250 each, and Velie, \$1,500 each.

Auburn, M. X.—For furnishing combination fire truck and auto tractor or auto tractor alone, from the following: United States Fire Apparatus Co., James Boyd & Bros., C. J. Cross & Co., American-La France Fire Engine Co., Knox Automobile Co., Woodhouse Mfg. Co., Couple-Gear Freight Wheel Co., Kanawha Fire Apparatus Co. and the Seagrave Co.

Dunmore, Pa.—For automobile fre truck, as follows: Standard Motor Car Co., for \$5,900, \$5,500 and \$3,650; James Boyd & Bros., \$5,500; American-La France Co., \$5,500; Knox Co., \$4,850; Kelley Motor Truck Co., \$3,568; Lackawanna Auto Co., \$4,250.

Johnstown, Pa.—For 1,800 ft. of fire

Co., \$4,250.

Johnstown, Pa.—For 1,800 ft. of fire hose, as follows: Eureka Fire Hose Co., 95 cts. to \$1.25 a ft.; Fabric Fire Hose Co., 95 cts. to \$1.20; Gutta Percha & Rubber Mfg. Co., rubber \$1.25 and cotton rubber lined \$1.10; Bi-Lateral Hose Co., Chicago, 85 cts. to \$1; United Globe & Rubber Co., Trenton, N. J., 90 cts. to \$1.05; Manhattan Rubber Mfg. Co., 90 cts.; New Jersey Car Spring & Rubber Co., 80 cts. to \$1; Diamond Rubber Co., \$1; C. C. Fire Hose Co., 90 cts. to \$1.

BRIDGES

Logansport, Ind.—Plans are being pre-pared for steel bridge at city electric ight plant.

Lake Charles, La.—Calcasieu parish has decided to construct bridge over Calcasieu River, between Lake Charles and West Lake, at cost of \$50,000.

Kalamazoo, Mich.—Plans for Mill st. bridge, to cost \$16,000, will be prepared at

Saginaw, Mich.—Lowest bidder on complete construction of Johnson st. bridge was from Interstate Construction Co., at 79,300 for plan A, sheet piling method; \$77,200 for cribbing method; plan B sheet piling, \$78,000; and cribbing, \$76,500. Phee Construction & Engineering Co. was only other bidder on complete structure under four methods, while Detroit Bridge & Steel Works bid on cribbing methods. Besides these three bidders on superstructure were Penn Bridge Co., Wisconsin Bridge & Iron Co., Joliet Bridge & Iron Co. and the Toledo Bridge & Crane Co. Bidders on sub-structure were: Detroit Bridge & Steel Works, Phee Construction & Engineering Co., W. N. Sager, A. Gelinas & Son and Interstate Construction Co. By combination of separate bids on sub- and super-structures between \$10,000 and \$15,000 might be saved.

Vicksburg, Miss.—Warren County will construct steel bridge over Ball Ground Creek, in Fifth District.

Troy, Mo.—Two steel bridges will be constructed in Lincoln County.

Genos, Neb.—Construction of steel bridge across Loup River has been authorized.

Ashland, O.—Bids will be received by Board of County Commisioners of Ash-

Genoa, Neb.—Construction of Steenbridge across Loup River has been authorized.

Ashland, O.—Bids will be received by Board of County Commisioners of Ashland County, O., at their office in the Court House, Ashland, O., until 12 o'clock noon, July 10, for purchase of bridge bonds in sum of \$20,000, for repair and construction of certain bridges. Lotta Westover, Clerk.

Johnstown, Pa.—Ordinance has been signed for erection of Haynes st. bridge.

York, Pa.—County Commissioners have decided to take definite action on improvement of Market st. bridge.

Fort Worth, Tex.—Street Commissioner Maddox will request county to commence its bridge building program at Samuels ave. bridge so connections with North Side may at no time be severed.

Richmond, Va.—Resolution to build bridge over James River at Ninth st. 1s being considered.

Yorkville, Wis.—Fund of \$1,582 has been reized for improvement of bridges.

Yorkville, Wis.—Fund of \$1,582 has been raised for improvement of bridges and highways.

CONTRACTS AWARDED

Oakville, Conn.—To construct light lat-ticed steel bridge at Oakville, to Meriden Iron & Brass Co., Meriden, Conn. Charles H. Preston, Jr., Waterbury, is Engineer-in-Charge.

min-Charge.

Hillsboro, Ill.—For erection of concrete bridge over city reservoir, to Driscoll & McCalman, of Decatur, Ill., for \$7,000.

Millageville, Ill.—To H. Ratzlow, Tiffany, Wis., at \$5,452, for construction of four bridges.

Newville, Ind.—By Board of Commissioners of Dekalb County, Auburn, Ind., to George Jaap, Ft. Wayne, Ind., for construction of \$0-ft. arch double span, at Newville.

South Bend, Ind.—To construct East La Salle Air Race bridge, to R. Z. Snell, South Bend, at \$16.500.

Topeks, Kan.—To raise, reconstruct and repair Brick Plant bridge across Kan.

sas River, to Leavenworth Bridge Co., Leavenworth, Kan., at \$29,500.

Boston, Mass.—For building steel draw span with draw machinery over north channel of Mystic River, by Department of Public Works, to Boston Bridge Works, 47 Winter st., Boston, \$117,977. Other bids as follows: Northeastern Structural Co., \$120,182; Pennsylvania Steel Co., Steelton, Pa., \$130,700.

Gering, Neb.—For constructing McGrew State aid bridge, to John L. Mullen, of Lincoln, for \$21,653, complete, including fills.

fills.

Lincoln, Neb.—To construct and repair bridges in Lincoln County during year, to Lincoln Construction Co.

Nebraska City, Neb.—To construct concrete bridge across South Table Creek, to Wilson Reinforced Concrete Co., at \$4.875.

\$4,875.

South Orange, N. J.—For construction of new steel beam bridge over Rahway River at Oakview ave., to O'Gara & McGuire, local contractors, at \$3,187.

of new steel beam bridge over Rahway River at Oakview ave., to 'Gara & McGuire, local contractors, at \$3,187.

Bush, N. Y.—To construct Rush-Wheatland bridge, to Owego Bridge Co., olean, N. Y., at \$23,944.

Salamanca, N. Y.—For erecting Main st. bridge, to Oswego Bridge Co., of Oswego, for \$67,972, by State Commission in Highways, at Albany.

Columbus, O.—By Director of Public Service, for constructing stone masonry arch at Iuka st., to John Hina, 711 Oakwood ave., at \$34,500.

Allentown, Pa.—To repair bridge across Little Lehigh Creek at Lehigh st., to Weaver Construction Co., at \$5,489.

Lancaster, Pa.—By Board of Commissioners of Lancaster County, to Nelson Meridyth Co., Chambersburg, Pa., at \$10,-286, for construction of 140 ft. steel and reinforced concrete bridge.

Mercer, Pa.—By County Commissioners, for stone work for number of county bridges. Successful bidders and price per perch follow: Black Run, Pine Township, F. S. Patton, \$4.60; F. C. Heasley, \$5. Schefield. New Vernon Township, W. T. Patton, \$4.20; Garrett, Shenango Township, G. W. Weikal, \$6; Stinger, Hempfield, G. F. Ramp, \$3.85; Tate run, West Middlesex, G. W. Weikal, stone \$5 concrete \$5.50; Steingrab, Jefferson Township, G. W. Weikal, stone \$5. concrete, \$5.75; Grove City, F. S. Patton, \$5.8.

Schoeneck, Pa.—By Supervisors of West Cocalice, for construction of bridges as follows: Reinholds Station bridge, Nelson, Merydith Co., Chambersburg, Pa., \$1,298; joint bridge between West Cocalice and Clay, P. B. Bucher, Litiz, Pa., \$5.72.

Scranton, Pa.—By Board of Commissioners of Lackawanna County, for construction of reinforced concrete bridges as follows: Five to Dingleberry & McLaughlin, Dixson City, Pa.; five to William La Rue, Newton, Pa., and one to Edward Wise, Moscow, Pa.

Greenville, Tex.—For erecting new bridge to span Sabine River at water works pump house and to carry new pipe for 50,000,000-gal. pump, to El Paso Bridge Co., by Mayor and Commissioners of Greenville. W. Va.—By Board of Com-

of Greenville. **Baileysville**, **W. Va.**—By Board of Commissioners of Wyoming County, to Farris Bridge Co., Pittsburgh, Pa., at \$7,900, for construction of bridge over Guyandotte

MISCELLANEOUS

Alhambra, Cal.—Board of City Trustees has decided to call bond issue for public improvements recommended by committee of Board of Trade in amounts requested in report submitted, with exception of bond issue of \$30,000 for fire fighting equipment, instead of \$15,000, and issue of \$10,000 for public park in north portion of city, instead of \$3,000.

Haywood, Cal.—Issuance of bonds for erection of new city hall is being discussed.

Recommends that strip of land 30 feet wide be acquired on each side of Fillmore st. tunnel. It recommends that sappropriation to complete work.

way for these two blocks 128% feet, present width of Fillmore st. being 68% feet.

San Prancisco, Cal.—By unanimous vote of 47 counties represented at banquet of Supervisors of State resolution was adopted requesting Legislature to submit to vote of people proposition of making State appropriation of \$1,000,000 for magnificent California building at exposition of 1915.

to vote of people proposition of making State appropriation of \$1,000,000 for magnificent California building at exposition of 1915.

Washington, D. C.—Foreign Government official is actively interested in all cholera preventatives and in ways and means of combating contagious diseases in general. At present large city over which he has control is without spray pumps, stationary and portable steam disinfecting devices, street sweeping machines, sheet iron dump carts, etc. Catalogues embracing articles for purpose as above outlined should be sent to American consul who furnished this information for transmission to proper authorities. No. 9095, Bureau of Manufactures.

Angusta, Ga.—City will issue \$1,250,000 worth of bonds as follows: For flood protection, \$1,000,000; for hospitals, \$150,000. Indianapolis, Ind.—Board of Park Commissioners contemplates buying dredging outfit for some of boulevard construction work along banks of streams of city.

Muncle, Ind.—County Commissioners are considering plans for proposed improvement to County Infirmary; estimated cost, \$50,000.

Boston, Mass.—City Council has authorized appropriation of \$24,000 for improvements at City Hospital.

Boston, Mass.—Negotiations are under way for extension of New England Sanitary Product Co.'s garbage disposal contract for three months at \$1,000 a week. Boston Development & Sanitary Co., which was given 10-year contract, will not be ready to start operations before October 1.

New Bedford, Mass. Giles & Tobey's bid of \$1,050 for Elmore machine was lowest received for chassis for police automobile patrol. Bids were as follows: Eristol County Auto Co., Abbott-Detroit, model 30, \$1,380; Francois X. Turgeon, Jr., Ohio Motor Co., \$1,800, \$2,000, \$2,200; Giles & Tobey, Elmore, \$1,050; Robert W.

Powers, 1913 Pope-Hartford, \$2,500; 1913 Hudson, \$1,875; 1912 Hudson, \$1,600; Auto Selling & Supply Co., White, \$2,300; Standard Motor Car Co., Buick, model 29, \$1,250, Buick, model 43, \$1,300; S. C. Lowe Supply Co., Chalmers, model 30, \$1,-600; Franklin, model G, \$1,900.

**Elamasco, Mich.—Plans for new police station and jail, to cost \$35,000, detention hospital and tuberculosis sanitarium, \$35,000, will be prepared at once.

st. Louis, Mo.—New jail will be erected at cost of \$190,000.

Anaconda, Mont.—It is understood that Board of County Commissioners of Silver Bow County is considering matter of asking people to vote additional bonds to amount of \$250,000 in order to complete furnishing and fitting of new courthouse and county jail.

Jersey City, N. J.—Having failed to secure from Board of Finance appropriation for seven-passenger automobile for their use, Street and Water Commissioners have decided to purchase two five-passenger car automobiles with money at their disposal in water account and awarded contract for supplying cars to Crescent Automobile Co. Autos will cost \$2,080 each.

each.

Boselle Park, N. J.—Ordinance authorizing erection of new Town Hall, at Clay ave. and Chestnut st., has passed its second and final readings.

Lockport, N. T.—Resolution has been presented calling for issuance of \$20,000 in bonds for establishing market.

in bonds for establishing market.

Rochester, N. Y.—Board of Estimate and Apportionment has appropriated \$3,000 for repair and equipment of Front st. playground.

Syracuse, N. Y.—Plans are being worked out for enlargement of municipal public baths in Leavenworth ave.

Erie, Pa.—Contracts for supplies and equipment of municipal garbage collection system, as recommended by Joint Garbage Committee, has been adopted.

Providence, R. I.—Board of Aldermen has authorized addition of \$15,000 to appropriation for City Hospital.

Brownwood, Tex.—Plans are being considered for erection of City Hall and central fire station.

Miami, Tex.—At special election held

here issuance of bonds for a \$40,000 court house for Roberts County carried by a vote of 112 to 11.

Milwankee, Wis.—Milwaukee will have new chlorination plant recommended by Mayor Bading if resolution appropriating \$8,000 for this purpose and recommended for adoption by Water Works Committee is adopted by Council.

CONTRACTS AWARDED

Eric, Pa.—By Special Garbage Committee of Councils, for 40 airtight pressed steel boxes, to American Boiler Works, at \$45 for each box.

Los Angeles, Cal.—To J. F. Atkinson, for Vermont Square Branch Library, at \$30,000.

**30,000. **Newark, N. J.—By East Newark Borough Council, to John Manley, for removal of garbage and ashes for ensuing year. His bid was \$790. In addition he is to receive \$35 each cleaning of Passaic ave., and \$1.50 for each sewer basin ave., and cleaned.

BIDS RECEIVED

Mew London, Conn.—Bids for improvements to City Hall in New London have been opened in Mayor's office. There were five bidders, and each submitted bids on four propositions, first being for brownstone, second for limestone, third for building with wood instead of fireproof floors, and fourth including marble stairs. Bids were all beyond amount city has available for such use. It has but \$60,000 and will need to secure about \$40,000 more. Bids submitted were as follows: Proposition 1—J. A. Dolan, \$85,000; Norcross Bros., \$87,900; Fenton-Charnley Building Co., \$88,380; R. Roe, Jr., \$93,000; H. R. Douglas, \$83,887. Proposition 2—Norcross Bros., \$87,400; J. A. Dolan, \$88,3811; Fenton-Charnley Building Co., \$30,380; R. Roe, Jr., \$92,000; H. R. Douglas, \$31,1380; J. A. Dolan, \$82,100; Norcross Bros., \$81,230; J. A. Dolan, \$82,100; Norcross Bros., \$8,5700; H. R. Douglas, \$91,358; R. Roe, Jr., \$98,574. Proposition 4—J. A. Dolan, \$88,408; Norcross Bros., \$83,400; R. Roe, Jr., \$93,300; H. R. Douglas, \$91,384; Fenton-Charnley Building Co., \$39,586; R. Roe, Jr., \$93,300; H. R. Douglas, \$91,384; Fenton-Charnley Building Co., \$39,580.

TOO LATE FOR CLASSIFICATION

BIDS ASKED FOR

| BIDS ASKED FOR | | | | | |
|--|--|---|--|---|--|
| STATE | Сіту | RECEIVED UNTIL | NATURE OF WORK. | Address Inquiries to | |
| | | | STREET IMPROVEMENTS | | |
| New Jersey Rhode Island. New Jersey New York New Jersey Illinois | Jersey City Providence Paterson Tuckahoe Linden Ouincy | July 8, 2 p.m July 10, 2.15 p.m July 10, 4.30 p.m July 10, 8 p.m July 10, 8 p.m | Pavg. Main street. Imp. 2 streets. Constrn. bitulithic and asphalt pav'ts. Constrn. 4,500 ft. cement gutter, catch basins, etc. Imp, streets and building sewers. Constrn. flag and concrete sidewalks. Paving with creosoted blocks and brick Surfacing with trap rock. Constrn, brick sidewalks and macadam drive. | E. B. See, Clk. Henry Fletcher, Mayor. Park Comm. Village Trustees. Jos. Ross, Dist. Clk. J. F. Garner, Chm. Bd. Local Lmp. | |
| Michigan | Pau Citu | Inter S. O. c. m | SEWERAGE Constrn. 8 to 12-in. sewer in several streets | P. O. Woodenff Chm Rd Pub Wks | |
| .urcingan | Day City | July 8, 9 a.m | | K. O. Woodfull, Chin. Ed. 1 db. Wks | |
| Oklahoma Indiana | Muskogee Shelbyville | July 9, 10 a.m July 16 | Constrn. 12,000 ft. 24-in. c. i. pipe | J. McClusker, Comr. City Clerk. | |
| | | | PIRE EQUIPMENT | | |
| Mississippi | Clarksdale | July 16, 8 p.m | Furn. motor comb, and chemical engine | M. W. Purnell, City Clk. | |
| | | | BRIDGES | | |
| New Jersey | Elizabeth | July 12, 3.30 p.m | Constrn. concrete bridge | J. L. Bauer, County Engr. | |
| | | | MIECRLLAWNOUS | | |
| Washington | Monroe | July 12, 5 p.m | Furn, steel partitions, doors, etc., for jail | Board of Managers. | |
| North Dakota. | Fargo | July 15, 5 p.m | Furn. 350 tons lime, 125 tons sulphate of iron, 125 tons sul- | A D W di C' A I | |
| | | | phate alumina, 60 tons soda ash, 25 tons hypochloride Furn. oil distributing machine, 3/2-yd. concrete mixer, 10-ton macadam roller, creosoted block, sandstone block, Portland | | |
| Ohio | Toledo | July 24, 10 a.m | cement, granite curb, sewer pipe, catcn basin covers Constrn. concrete abutments on road | A. I. Hatch, County Surv. | |

STREET IMPROVEMENTS

Redwood City, Cal.—Delegates from every section of San Mateo County have indorsed plans of Board of Supervisors to construct \$1,500,000 system of highways in county. Citizens urged all possible haste in calling the bond election so that new roads may be completed before 1915. Plans call for 119 miles of asphalt road, including laterals running east and west from bay side to ocean shore, highway over old San Bruno rd., from San Francisco to San Bruno by way of bay shore, and scenic ocean boulevard paralleling shore line and extending entire length of county.

Gloucester, Mass.—State roads to be built in three sections and aggregate a total of between 50 and 75 miles, exact amount to be determined by amount of appropriation which will be available. First section will begin at Nashua, running through towns of Merrimack and Lendondary to Manchester, omitting thickly settled portions of Manchester and running through Candia, Hooksett, Bow and Pembroke. Second section will begin beyond Concord and run north through Penacock, Boscawen, Franklin. Tilton and Laconia and probably to Lake Winnipesaukee. Third section will start at Portsmouth by way of Dover Somersworth, Rollinsford and Gonic to Roches

ter, and will probably be later extended beyond Rochester through Hayes, Milton and Union to Alton Bay and Lake Winnipesaukee on south.

Lawrence, Mass.—City is considering laying out of Richmond st.

St. Paul, Minn.—Bids have been rejected on two occasions for paving Fourth st. and Fifth st. City will now do the work. G. H. Herrold, Office Engineer.

St. Paul, Minn.—Bids will be received at office of City Comptroller until July 12, for purchase of \$24.947.48 for paving Fifth st., and \$17,729.25 for paving of Fourth st. W. C. Handy, City Controller.

St. Joseph, Mo.—Election will be held

reserves Roads revents Dust-



Boulevard-East Side Mississippi River-Minneapolis, Minn., Road Treated with Tarvia A.

'makes good" in Minneapolis

M INNEAPOLIS has been using Tarvia since 1907—and is using it still. On November 24, 1911, Mr. Theodore Wirth, Superintendent of the Board of Park Commissioners, Minneapolis, wrote:

"The Tarvia applied on Minnehaha Avenue in October, 1907, gave very satisfactory results. The application was made under the most ideal conditions, the new roadbed being just right to receive the binder and the screenings used for covering being of excellent quality. The surface withstood the traffic well and although the treatment has not been repeated, the roadbed is still in fairly good condition.

The 46th St. section of King's Highway was similarly treated in September, 1908, but in place of using stone screenings for covering, we used a fine pea gravel, which gave a pleasing color and a still better wearing surface.

The last piece of tarviating we did was on the new River Road, East from Franklin Avenue, South to the City limits, where we also used pea gravel for dressing over Tarvia coating, with the same excellent results.

This road was finished in June, 1910 and has been in constant use ever since by an immense amount of automobile traffic. I hope to be able to treat this road again with Tarvia next Spring. I am well pleased with the results of Tarvia on our roads."

There are three kinds of Tarvia—Tarvia X for road and pavement construction, Tarvia A for surface work and Tarvia B for dust suppression and road preservation.

Booklet Describing These Treatments Free on Request.

BARRETT MANUFACTURING CO.

Philadelphia Boston St. Louis Cleveland Chicago New York Pittsburgh Cincinnati Kansas City Minneapolis New Orleans Seattle London, Eng.

THE PATERSON MFG. CO., Ltd.—Montreal Toronto Winnipeg Vancouver St. John, N. B. Halifax, N. S.



August 10 for voting on bond issue of \$1,000,000 for good roads.

Auburn, W. Y.—Elizabeth st., from Mary st. to South st., will be paved. City Engineer has been directed to prepare plans and specifications for paving with birdlights.

bitulithic.

Niagara Falls, N. Y.—Resolutions have been adopted for paving or macadamizing Bellevue ave. at cost of \$3,825; also Spring st., at cost of \$7,100, and various other streets. T. H. Hogan, City

Clerk.

Bochester, M. Y.—Resolution will be offered by Supervisor Louis J. Dubelbeiss, of Irondequoit, for construction of bituminous asphalt pavement on East blvd., between Hudson ave. and Summerville, at cost approximating \$60,000. It will be known as concrete-asphalt road, with 2 in. of asphalt and 5 in. of concrete. It will be 18 ft. in width, with gravel shoulders on the side and will be 2½ miles in length.

Bochester, M. Y.—Plans for new street parallel to Main st. are being discussed. Estimated cost of improvement is \$2,000,000.

Altoona, Pa.—City will pave two blocks n Washington ave. to connect Buckhorn

rd. Erie, Pa.—Ordinance has been passed providing for grading, curbing and paving Park ave., Poplar to Plum sts., and Plum, from Park ave. to Sixth st.; also for grading, curbing and paving of Ninth st., Weschler ave. to Cranberry

Erie, Pa.—Petitions for paving of North Queen st., between Market and Philadelphia sts., and of Hawthorne st. north from Linden ave. to city limits, are before Councils. Petitions are also out for paving of South Queen st and South Water st.

before Councils. Petitions are also out for paving of South Queen st and South Water st.

Erie, Pa.—Resolution has been adopted for grading, curbing and paving Reed, 13th to 15th sts.

Erie, Pa.—All bids on paving of Cherry st. have been rejected by Councils. Pavement was to have been laid between 18th and 19th on Cherry, and J. & M. Doyle were lowest biddens. They offered to do work for \$1.55 per sq. yd. with Class B asphalt, and for \$1.65 per yd. with brick. Mayer Bros. Construction Co. put in bid of \$1.60 for asphalt and \$1.66 for brick. John McCormick & Son bid \$1.58 on asphalt and \$1.68 on brick.

brick.

Pranklin, Pa.—Ordinance has been passed providing for curbing and paving of Eagle st., from north side of 11th st. to west side of 12th st.

Harrisburg, Pa.—Ordinance has been passed to authorize paving and curbing of Howard Alley, from Emeraid st. to Curtin st.

Curtin st.

Hazleton, Pa.—Oiling of various streets has been authorized.

Oil City, Pa.—Member Cordie has recommended that steps be taken for grading, curbing and paving of Washington ave., from Harriott ave. to Colbert ave. York, Pa.—Bids will be asked for paving of East Market st., from Sherman to Lehman st.

San Angelo, Tex.—City has asked for bids for paving of 23,000 sq. yds. of street with creosoted pine blocks. A. C. McDonald, City Secretary; J. J. Goodfellow, City Engineer.

CONTRACTS AWARDED

Alhambra, Cal.—To Montgomery & Marsh, of Los Angeles, for improving Mission rd., from Marengo ave. to San Bernardina rd., at \$1.35 per lin. ft. for grading and paving. O. F. Easley, 5.9 cts. per sq. ft. for paving and 43 cts. per lin. ft. for grading W. A. Keep, 5.4 cts. and 39 cts.; W. A. Dontanville, 8 cts. and 37 cts.

lin. ft. for grading W. A. Keep, 5.4 cus. and 39 cts.; W. A. Dontanville, 8 cts. and 37 cts.

Sacramento, Cal.—Contracts aggregating \$295,000 for four strips of roadway to be built under \$18,000,000 State highway bond issue in Madera, San Meteo, Mendocino and Yuba Counties have been let by State Highway Commission. Lowest bidder in each case received award. Total distance of four strips is 37 miles. Ransome Crummey Co., of Oakland, was awarded contract for construction of 10-mile road, from Madera City to Califa, Medera County, their bid for which amounted to \$72,091. F. R. Ritchie & Co., of San Francisco, was given contract for construction of 5 4-10-mile strip of roadway, from South San Francisco to Burlingame, their bid being \$89,368. General Contracting Corporation of San Francisco received contract for 13-mile strip of roadway, from south boundary of Mendocino County to Hopland, for which their bid was \$67,425. F. E. Frey, of Mendocino County to Hopland, for work on constructing 9-mile strip, from Morrison's crossing, Yuba County to

Marysville, for which his figure was \$67,-

Marysville, for which his figure was \$67,780.

Upland, Cal. — To Montgomery & Marsh, of Los Angeles, for improvement of Second ave., from A to 11th st., at 15.9 cts. per sq. ft. for paving, and 11 cts. per sq. ft. for gutter. For asphalt paving and cement guttering of Second st. to Montgomery & Marsh, I. W. Hellman Bldg., Los Angeles, 15.9 cts. per sq. ft. for paving and 11 cts. per sq. ft. for paving and 11 cts. per sq. ft. for paving and 11 cts. per sq. ft. For cement gutter.

Peoria, III.—To John W. Bushnell, at \$9,225, for resurfacing of Ravine ave., from Knoxville to Wisconsin.

Springfield, III.—For paving, by City Council, as follows: Eleventh st., from N. Grand ave. to Ridgely ave., Nelch & Son, Springfield, \$1.75 per sq. yd., and 55 cts. per ft. for curbing: College st., from Allen st. to S. Grand ave., R. F. Egan, Springfield; Lawrence ave., from Seventh to Eighth sts., R. F. Egan.

Woodstock, III.—To Logan & Giertz, of Eigin, for furnishing labor and material necessary for construction of 14, 827 sq. yds. of vitrified brick pavement on Portland cement concrete foundation. Contract also includes 2,660 lin. ft. of concrete curbing and 1,321 ft. of storm water sewer connection.

Amsterdam, M. Y.—To Thomas Leonard & Co., at \$6,677.50, for grading and resurfacing Guy Park ave. with crushed stone and Tarvia.

Auburn, M. Y.—Contracts aggregating more than \$27,000 have been awarded by Common Council. Tumpuski & Stento, of Binghamton, received two awards, their first in Auburn and first ever let to Polish contractors. They will pave Lincoln st., part with Bessemer brick and on hill with Median standstone brick, for \$10,287.65. They will also construct sanitary sewer in Green st., from Clark to Genesse st., for \$93.355. Tine & Willey will pave entire length of Green st. with Bessemer brick for \$8,007.78. They will also pave Five Points with the same material for \$4,765.13.

Delaware, O.—To Kissner Martt, Delaware, at \$9,295. for grading and paving with waterbound macadam Sunbury rd., in Dalaware and Brown Town

watery \$20,000.

Verona, Pa.—To J. P. Sheets & Co., of Pittsburgh, at \$16,000, for paving Wild-

PROPOSALS

FILTER PLANT

Culpeper, Va., June 26, 1912, Sealed proposals for filter plant will be received by the Town Council of Culpeper, on or before 12.00 o'clock noon, July 12, 1912, for furnishing all labor and materials for the construction of a filtration plant capable of delivering 1,000,000 gallons per day of 24 hours, including brick filter house, filters, chemical feed devices and all pipe work.

Each proposal must be accompanied by a certified check for \$500.00, made payable to the City Attorney, conditioned if a bid is accepted, contract will be entered into and the performance of same secured within 10 days after notification of acceptance of bid. In case bid is accepted and contract entered into, check will be returned.

No bid will be received after the hour and date mentioned, and no bid will be allowed to be withdrawn after the date and hour set,

Successful bidder will be required to furnish bond of an acceptable Surety Company in the full amount of contract price.

General instructions to bidders will be furnished upon application.

The right is reserved to reject any or all bids. For further information address

E. E. JOHNSON, City Attorney, Culpeper, Va.

PROPOSALS

STREET IMPROVEMENT

Bloomfield, Ia., June 25, 1912.

Paving 44,035 yds. pavement, Brick, Asphaltic, concrete or cement; 21,406 lin, ft. of curb, 3,915 cu. yds, grading, 200 ft. 12-in, storm sewer, 30 blocks of paving. Bids will be opened July 16, 8 p. m., 1912. For specifications and plans or information address

A, B, WELCH, City Clerk, (1-2)

BIDS FOR BUILDING BRIDGE

Sealed bids will be received at the office of the County Auditor of the County of Crow Wing, at the County Court House, in the City of Brainerd, Minnesota, until 3 o'clock p. m., July 13, 1912, for building a bridge on highway across Crow Wing River, between Sections 32 and 33, Township 133 north, of range 29 west 5th P. M., in the counties of Cass and Morrison, State of Minnesota. Such bridge to be 283 ft. long, three span, 16-ft. roadway clear, floor of bridge 20 ft. above river bed at center, foundation constructed of concrete abutments and tubular steel piers, according to plans and specifications now on file with the said County Auditor of Crow Wing County. At the same time and place bids will be received from any bidder, on his own plans and specifications for a bridge of equal service and durability at the same location.

Each proposal must be accompanied by certified check to the amount of 10 per cent. of his bid, payable to the Chairman of the committee hereinafter named. The Committee representing the Counties of Crow Wing, Cass and Morrison, reserves the right to accept or reject any and all

bids and proposals.

(26-1)

J. A. ERICKSON, Chairman of Committee representing Crow Wing, Cass and Morrison Counties, Minn.

FIRE EQUIPMENT

NOTICE TO MANUFACTURERS

The Secretary of the Borough of Sharon, Pa., will receive proposals until 12 o'clock noon, Aug. 6, 1912, for the purchase of an automobile fire engine. Manufacturers will submit specifications.

OSCAR J. DENNY, Borough Secretary.

FOR SALE

Twenty horse-drawn street watering carts, mostly steel tanks, and all in good condition.

AMERICAN CAR SPRINKLER CO. Worcester, Mass.

FOR SALE CHEAP

Wrought Pipe, second hand, all sizes, recut and rethreaded suitable for all classes of work. Prices quoted on application.

MARINE METAL & SUPPLY CO. TERM 167South Street, New York City

SECOND HAND TRANSITS and LEVELS FOR SALE

70.00

THE ENGINEERING! AGENCY, IDC. Monadnock Block Chicago